Total No. of Printed Pages-3]

CC(M)

AGRICULTURE

(OPTIONAL)

PAPER - II

[07]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. a) What are the basic structural components of chromosomes? Discuss the concepts of linkage and crossing over, and how crossing over contributes to genetic variation and recombination. **(10)**

b) What is the role of pre-breeding and gene introgression in widening the genetic base of cultivated varieties? Describe the role of gene banks in the conservation and utilization of PGR in India. **(10)**

c) Discuss the different types of nutrients required by plants, their functions, and how they are absorbed by plant roots. **(10)**

d) Define biological control and describe the different types of biocontrol agents used against pests and plant diseases. Discuss the advantages and limitations of biocontrol, and provide examples of successful biocontrol practices in agriculture. **(10)**

e) What is a centre of origin and how is it different from a centre of diversity? What challenges are associated with using wild relatives in plant breeding? **(10)**

2. a) Describe the various stages involved in the production and post-harvest handling of quality seeds. Discuss in detail the processes of seed certification, including the standards followed, and explain the importance and methods of seed storage in maintaining seed viability. **(20)**

b) Why TRIPs Agreement is important and discuss impact of TRIPS on relevant Indian legislation and its effect. **(15)**

c) What are different types of Intellectual Property Rights (IPRs) and how do they grant protection to the owner of an IPR? **(15)**

3. a) Why knowledge of mode of reproduction is essential for plant breeders? Why hybrids are more successful in cross-pollinated crops than self-pollinated crops? **(15)**

b) Differentiate between genetic and cytoplasmic male sterility and discuss the role of male sterility in hybrid seed production. **(15)**

c) Write a short note on apomixis, its types, and its application in plant breeding with examples. **(10)**

d) Define General Combining Ability (GCA) and Specific Combining Ability (SCA) in plant breeding. Why are they important in the selection of parents and hybrids during crop improvement programs? **(10)**

4. a) Describe the phases of photosynthesis and the functions of photosynthetic pigments and their significance in light absorption. Compare the C3, C4, and CAM pathways. **(20)**

b) What is seed dormancy? How does the seed coat help in seed dormancy? Describe various methods used to break seed dormancy. **(15)**

c) Define abiotic stress and describe the physiological and biochemical responses of plants to drought and salinity stress. **(15)**

SECTION - B

5. a) What are sex-linked, sex-influenced, and sex-limited traits? Briefly explain each type with an example. **(10)**

b) List the different strategies used for managing plant diseases. Highlight the Integrated Disease Management (IDM) concept with suitable examples. **(10)**

c) Discuss the objectives and key components of the National Food Security Act and the Public Distribution System (PDS). How do these policies contribute to food security and the alleviation of hunger and poverty? **(10)**

d) What is the difference between biofortification and fortification? Explain how biofortification helps in the alleviation of malnutrition. **(10)**

e) Explain the different types of plant growth hormones and their roles in regulating plant growth and development. **(10)**

6. a) Explain the major causes of post-harvest losses in fruits and vegetables. Discuss various post-harvest handling techniques, including grading, packaging, storage, and value addition to reduce losses and improve shelf life. **(20)**

b) What is landscaping? Describe the basic principles and elements of landscape design. Also, explain the scope of commercial floriculture in India, mentioning key flowers grown, cultivation requirements, and marketing strategies. **(20)**

c) Define protected cultivation and discuss its importance in horticulture. Describe different types of protected structures and high-tech interventions used in vegetable or flower production. **(10)**

7. a) Classify pesticides based on their mode of action, target pests and applications. Describe the various formulations of pesticides and their use. **(20)**

b) Describe the major pests of stored grains in Indian conditions, their mode of damage, and economic impact. Explain the preventive and curative methods of managing storage pests, including traditional and modern practices. **(15)**

c) Explain the basic concepts and components of plant disease epidemiology and the factors influencing disease development. Briefly explain the role of plant quarantine in preventing disease spread. **(15)**

8. a) What is Marker-Assisted Selection (MAS)? List the steps involved in MAS. Discuss with examples, the role of MAS in crop improvement. **(20)**

b) What is heterosis? Why are hybrids largely successful in cross-pollinated crops than self-pollinated crops? Discuss why hybrid seed needs to be replaced every year. **(15)**

c) List commonly used physical and chemical mutagens in crop improvement. Discuss the advantages and limitations of mutation breeding. Give three examples of crops and target traits improved through mutation breeding. **(15)**

Total No. of Printed Pages-3]

CC(M)
ANIMAL HUSBANDRY AND VETERINARY SCIENCE
(OPTIONAL)
PAPER - II
[08]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. a) What is the difference between pasteurization and sterilization? Explain the significance of both heat treatments in milk processing. Discuss the different methods used for sterilization of milk. **(20)**

b) What is placenta? Describe the different types of placentae on the basis of its histological structure. **(10)**

c) Explain clinical uses, side effects and contraindications of diazepam in veterinary practice. **(10)**

d) What are the most common foodborne pathogens, how do food handling and preparation practices contribute to the risk of foodborne infections, and what are the key interventions to prevent these infections? **(10)**

2. a) What is meat inspection? List the facilities, procedures and decisions a veterinarian makes during the antemortem and postmortem inspection of meat animals. **(20)**

b) Discuss the mechanism of action, clinical findings, diagnosis and treatment of organophosphate toxicity in dairy animals. **(10)**

c) Compare the following: **(2×5=10)**

i) Decerebrate rigidity and decerebellate rigidity.

ii) Upper motor neuron signs and lower motor neuron signs.

d) Describe the structure of mammalian ovary depicting the detailed structure of all types of follicles. **(10)**

3. a) Explain the origin, course and distribution of cranial nerves in a sequence. **(20)**

b) Enlist the major causes of infectious diarrhoea in calves. Discuss their clinical signs, pathological findings, diagnosis and age groups that are affected the most. **(10)**

c) Discuss the following : **(2×5=10)**

i) Why homogenization is carried out at 60°C?

ii) What are the packaging requirements for butter?

d) What is meat adulteration? Describe in detail various methods to detect meat adulteration. **(10)**

4. a) Discuss clinical, pathological, diagnostic and therapeutic aspects of micro-mineral deficiencies in cattle. **(20)**

b) How do Indian laws and regulations address issues such as animal slaughter, animal transportation, and animal research? **(10)**

c) Explain the role of the following: **(2×5 =10)**

i) WOAH/OIE in animal health monitoring and surveillance

ii) Sanitary and Phytosanitary measures in global trade of livestock products

d) Discuss various nerve blocks used for regional surgeries in cattle. **(10)**

SECTION - B

5. a) Discuss mechanism of action, pharmacological effects, clinical uses, adverse effects and precautions of potassium sparing diuretics. **(20)**

b) Explain incidence, prevalence, and relative risk. How these concepts are used to describe and analyze disease patterns? **(10)**

c) Give the classification of khoa and their uses in different varieties of khoa-based sweets. Discuss in detail the manufacturing procedure of khoa. **(10)**

d) What do you understand by stunning of meat animals? Explain the mechanical method of stunning in detail. **(10)**

6. a) Discuss in detail the outcome of negative energy balance during transition period in dairy animals. **(20)**

b) Discuss the structure and function of mammary gland in cow. **(10)**

c) Explain the following: **(2×5=10)**

i) Repeated use of flunixin in equine colic can lead to misdiagnosis.

ii) Mechanisms of development of antimicrobial resistance.

d) Explain the structure, composition and nutritive value of poultry egg. **(10)**

7. a) What are the different classifications of animal slaughter industry byproducts? Explain the collection, handling and utilization of pharmaceutical industry byproducts in detail. **(20)**

b) Explain stage III of general anaesthesia. **(10)**

c) Differentiate between: **(2×5=10)**

i) Recombined and reconstituted milk.

ii) Toned and double toned milk.

iii) Evaporated and sweetened condensed milk.

iv) Dahi and yoghurt.

v) Kulfi and ice cream.

d) Explain: **(2×5=10)**

i) Structure and function of oviduct of hen.

ii) Gross and histology of adrenal gland in bovines.

8. a) What is the impact of climate change on animal health and productivity, and what mitigation strategies can be implemented to reduce the negative effects of climate change on animal agriculture? **(20)**

b) Classify NSAIDs with one example of each class. **(10)**

c) Write a detailed note on the following: **(2×5=10)**

i) Lumpy Skin Disease in cattle.

ii) Glanders in horses.

d) How does the Prevention of Cruelty to Animals Act, 1960, define animal cruelty. What are the penalties for violating this law? **(10)**

Total No. of Printed Pages-3]

CC(M)

ANTHROPOLOGY

(OPTIONAL)

PAPER - II

[09]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION-A

1. Write notes on the following in about 150 words each:

a) Indian Museum and Anthropology **(10)**

b) Ramapithecus **(10)**

c) Sacred Complex and Development **(10)**

d) Health of Pastoral Communities **(10)**

e) B.R. Ambedkar on the Caste System **(10)**

2. a) Define Ethnoarchaeology. Discuss the importance of analogy as a research tool in ethnoarchaeology. **(20)**

b) Examine the Canadian government's approach to indigenous affairs. How is this approach different from the Indian approach to scheduled tribes? **(15)**

c) What was the reason for starting with the Tribal Sub Plan? Critically evaluate the Tribal Sub-Plan initiative of the Government of India. **(15)**

3. a) Explain the problems of land alienation among tribals and peasants of India. **(20)**

b) Discuss the impact of Digital India on the economic life of Scheduled Tribes. **(15)**

c) Critically compare Guha's and Sarkar's approaches to classifying the Indian population. **(15)**

4. a) Examine the relationship between Caste, inequality and poverty in India. **(20)**

b) Discuss the indigenous and exogenous factors of Social Change in India. Is social media a powerful catalyst for Social Change? **(15)**

c) Explain the evolution of Forest Governance in India. Can conservation of forests, wildlife protection and community rights coexist? **(15)**

SECTION - B

5. Write notes on the following in about 150 words each:

a) Neolithic Culture in Kashmir **(10)**

b) Census and Caste **(10)**

c) New Scheduled Tribes in Jammu and Kashmir **(10)**

d) Birsa Munda **(10)**

e) Jews in India **(10)**

6. a) Critically assess the impact of Islam and Christianity on tribal society and culture. **(20)**

b) What is the Great Nicobar Island Project? Discuss the possible impacts of development initiatives on the PVTGs of the Andaman and Nicobar Islands. **(15)**

c) Critically examine how Islam impacted art and architecture in India in general and religion in Kashmir in particular? **(15)**

7. a) Appraise the role of Anthropologists in rural and tribal development. **(20)**

b) Examine the role of the government in tackling the sickle cell disease in India. **(15)**

c) Examine the key provisions in the Constitution of India that empower and uplift Scheduled Tribes. **(15)**

8. a) Discuss challenges in Tribal Development in India today. Can we learn anything from the Elwin-Ghurye Debate? **(20)**

b) Examine the linguistic diversity in India. Discuss the significance of language in political movements. **(15)**

c) Examine the foundational elements of the Indian society. Are you noticing any significant changes today? **(15)**

Total No. of Printed Pages-3]

CC(M)

BOTANY

(OPTIONAL)

PAPER - II

[10]

Time Allowed - Three Hours	*Maximum Marks-250*

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SECTION - A

1. Write short notes on the following:

a) Write a note on chemiosmotic theory. **(10)**

b) Explain the key provisions of the Environment Protection Act, 1986. How effective is it in addressing modern environmental challenges? **(10)**

c) Define linkage and linkage disequilibrium. Why are they important in plant trait mapping? **(10)**

d) Discuss the evolutionary advantages of polyploidy in plants. **(10)**

e) Explain the impact of inversions, translocations, deletions, and duplications on gene expression. **(10)**

2. a) How is the phytosociological analysis of a plant community different from floristic. Elaborate upon the different characters used to describe a plant community. **(20)**

b) Differentiate between standard deviation and coefficient of variation. When is coefficient of variation more useful? Give biological examples. **(15)**

c) 'Understanding molecular mechanisms of fruit ripening can be a boon to horticulture'. Comment on the statement. Give examples where genetic manipulation has benefitted horticulture produce. **(15)**

3. a) 'Secondary / specialised metabolites in plants are as important as primary metabolites.' Justify the statement with relevant examples. **(20)**

b) Compare the principles, advantages, limitations, and applications of the major gene transfer techniques used in plants. **(15)**

c) Differentiate between weeds and invasive species. What characters do some species possess that make them invasive? Suggest measures to control such species. **(15)**

4. a) 'Achievement of sustainable development goals require equal participation of science and society.' Comment on the statement. **(20)**

b) Differentiate between the following: **(15)**

i. Wildlife Sanctuary and National Park

ii. CAM and C_4 pathway

iii. Gram positive (+) and Gram negative (-) bacteria

c) What are enzymes? Enumerate their characteristics. Discuss the different mechanisms of regulation of enzymes. **(15)**

SECTION - B

5. Write short notes on the following:

a) Explain the biogenesis and functions of peroxisomes. **(10)**

b) Discuss the principle, advantages, and limitations of RAPD. **(10)**

c) Write a note on phytoremediation. Explain its potential and challenges in environmental cleanup. **(10)**

d) Explain the structure and photoreversible properties of phytochrome. How does it regulate plant development? **(10)**

e) Describe the wobble hypothesis and its significance in the genetic code. **(10)**

6. a) Describe the cell membrane structure and explain key membrane transport mechanisms. How do cells control selective permeability? **(20)**

b) Discuss the biochemical and molecular mechanisms present in halophiles. **(15)**

c) 'Recent studies indicate that RNA is no longer only a messenger molecule'. Justify the statement. Comment upon the role played by RNA in origin and evolution of life on earth. **(15)**

7. a) What are Farmers' rights as recognized under the Protection of Plant Varieties and Farmers' Rights Act (PPVFRA), 2001? How do they contribute to the conservation and sustainable use of plant genetic resources? **(20)**

b) 'Cytoplasmic inheritance is also known as maternal inheritance'. Comment on the statement with suitable examples. **(15)**

c) What are oncogenes? What role do they play in onset of cancer? Discuss the salient features of cancer cells that make them different from normal cells. **(15)**

8. a) Discuss the criteria of essentiality of nutrients for plants. Elaborate upon the role, deficiency symptoms caused due to deficiency of the calcium, boron and magnesium in plants. **(20)**

b) Explain how the structural and mitotic behaviour of B chromosomes affects cell cycle regulation and chromosomal stability in eukaryotic cells. **(15)**

c) With the help of suitable diagram discuss about the role of symbiotic and free living bacteria in Nitrogen fixation. **(15)**

Total No. of Printed Pages-8]

CC(M)

CHEMISTRY

(OPTIONAL)

PAPER - II

[11]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. a) Give the structural formulas for the alkenes formed on dehydrobromination of the following alkyl bromides and underline the principal product in each reaction: i) 1-bromobutane, ii) 2-bromobutane, iii) 3-bromopentane, iv) 2-bromo-2-methylpentane, v) 3-bromo-2-methylpentane, vi) 3-bromo-2,3-dimethylpentane. **(2+3+2+2+3+3=15)**

b) Account for aromaticity observed in : i) azulene; ii) 1,3-cyclopentadienyl anion but not 1,3-cyclopentadiene; iii) 1,3,5-cycloheptatrienyl cation but not 1,3,5-cycloheptatriene; iv) cyclopropenyl cation; v) the heterocycles pyrrole, furan and pyridine. **(10)**

c) What compound C_7H_8O has nmr signals at δ 7.3, 4.4, and 3.7 ppm, with relative areas 7:2.9: 1.4, respectively ? **(10)**

d) What products are formed in the following reactions?

i) $CH_3CH_2OH, Cr_2O_7^{2-}, H^+$

ii) $CH_3CHOHCH_3, Cr_2O_7^{2-}, H^+ (60^oC)$

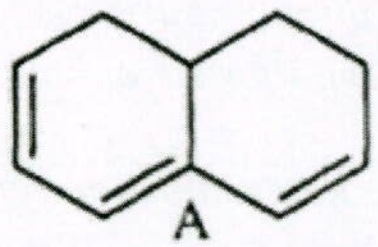
iii) $CH_3COCl, LiAl(O\text{-}t\text{-}C_4H_9)_3H$

iv) $CH_3COCl, C_6H_6, AlCl_3$

v) $CH_3COCl, C_6H_5NO_2, AlCl_3$. **(5×2=10)**

e) The second ionization constant (K_2) for fumaric acid (*trans*-butaenedioic acid) is greater than that for maleic acid, the cis isomer. Justify. **(5)**

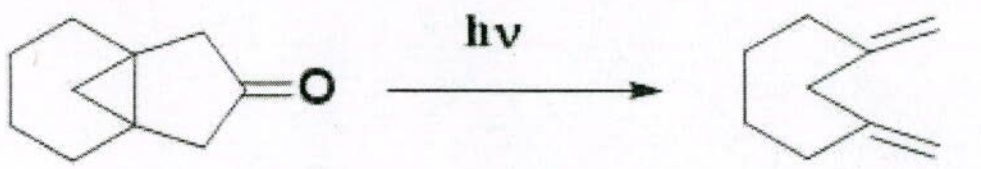
2. a) Hydrogenation of one mole of the triene A with one mole of H_2 gives isomeric dienes having molecular formula $C_{10}H_{14}$. Show how UV spectroscopy and the expected λ_{max} values could distinguish these isomers:



A

(15)

b) Give the mechanism of the following transformation:

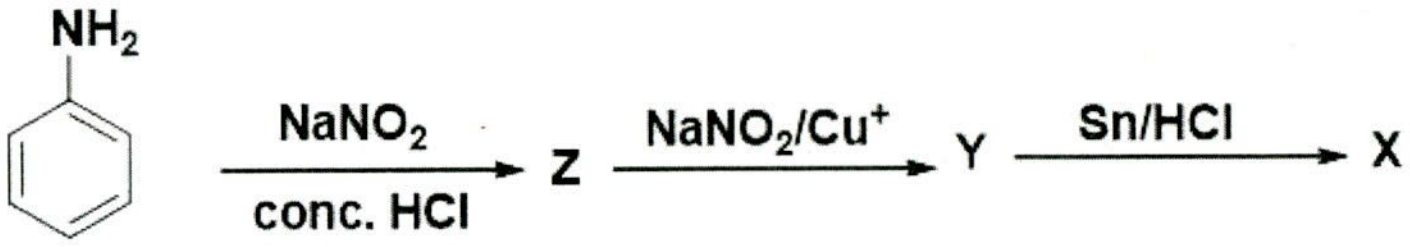


70% Yield

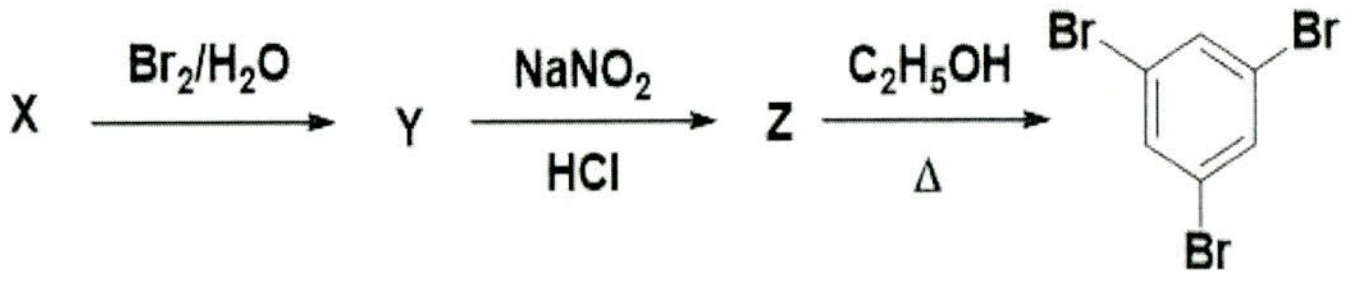
(15)

c) What will be the (X) in the below mentioned reaction sequences? Give the structures of all the intermediate compounds. **(2×5=10)**

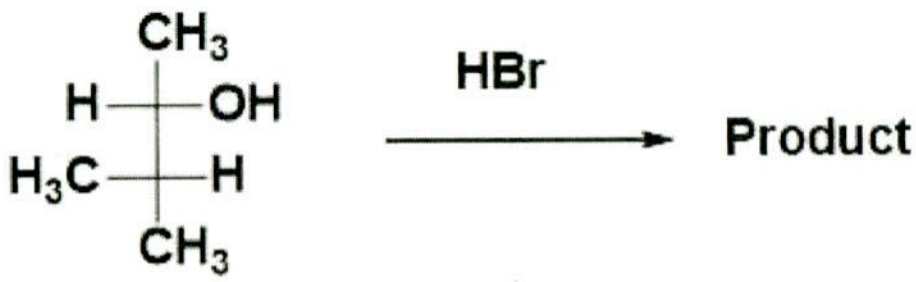
i)



ii)



d) Elaborate the product formed in the following reaction, give all the intermediate steps?

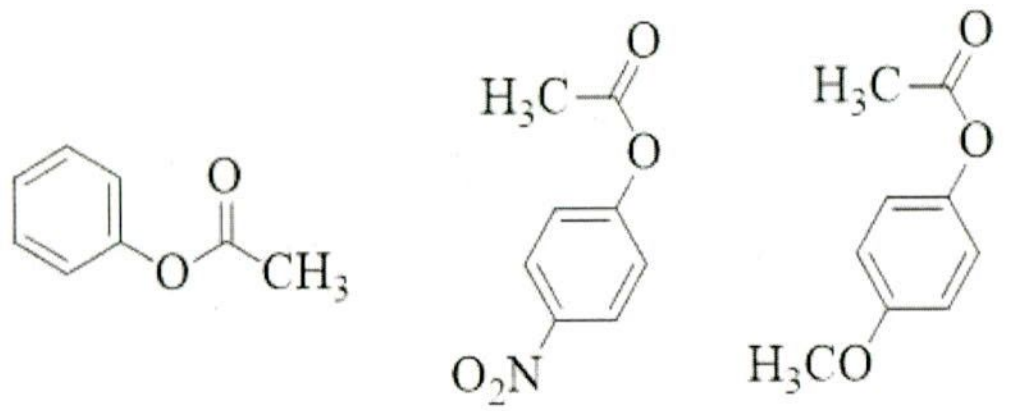


(10)

3. a) Sulfonation resembles nitration and halogenation in being an electrophilic aromatic substitution, but differs in being a reversible reaction. Explain this statement with the help of energy profile diagrams (enthalpy vs reaction coordinate) for both sulfonation and nitration/halogenation. Discuss the factors contributing to the reversibility of Sulfonation. **(15)**

b) i) a) Compound (A), C_7H_8O, is insoluble in aqueous $NaHCO_3$ but dissolves in NaOH. When treated with bromine water, (A) rapidly forms compound (B), $C_7H_5OBr_3$. Give structures for (A) and (B). b) What would (A) have to be if it did not dissolve in NaOH?

ii) List the following esters in order of decreasing reactivity toward hydrolysis, Give reasons for.



iii) R-OH reacts with NaBr in the presence of H_2SO_4 to give RBr. Why is H_2SO_4 required? What is the mechanism of the reaction? **(3×5=15)**

c) Write structures for the mononitration products of the following compounds, and explain their formation : a) 3-nitropyrrole, b) 3-methoxythiophene,

c) 2-acetylthiophene, d) 5-methyl-2-methoxythiophene, e) 5-methylfuran-2 carboxylic acid. **(5×2=10)**

d) Using IR spectroscopy, how will you distinguish the following isomeric compounds:

(i) $CH_3CH_2C{\equiv}CH$ and $H_3CC{\equiv}CCH_3$

(ii) CH_3CH_2OH and CH_3OCH_3

(iii) $(CH_3)_3N$ and $CH_3CH_2NHCH_3$

(iv) CH_3CH_2CHO and CH_3COCH_3

(v) $CH_3{=}CHOCH_3$ and CH_3CH_2CHO **(5×2=10)**

4. a) (i) Dehydrohalogenation of 3-bromohexane gives a mixture of cis-2 hexene and trans-2-hexene. How can this mixture be converted to pure a) cis-2-hexene? b) trans-2-hexene?

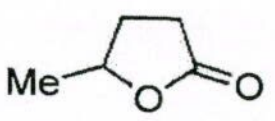
(ii) Assuming that anti elimination is favored, illustrate the stereospecificity of the E2 dehydrohalogenation by predicting the products formed from (a) meso- and (b) either of the enantiomers of 2,3-dibromobutane. Use the wedge-sawhorse and Newman projections. **(2×10=20)**

b) Give Product(s) of the following reactions:

(i) $RCONHR' + HNO_2 \longrightarrow$

(ii) $RCONR_2 + HNO_2 \longrightarrow$

(iii) $PhCH_2COOMe \xrightarrow[(ii)\ H_3O^+]{(i)\ 2\ eq\ of\ n\text{-}BuLi}$

(iv)  $\xrightarrow[(ii)\ HCl]{(i)\ NaOH}$

(v) $CH_3CH_2COOCH_2Ph \xrightarrow[(ii)\ H_3O^+]{(i)\ NaOH}$

(5×2=10)

c) Reason the following:

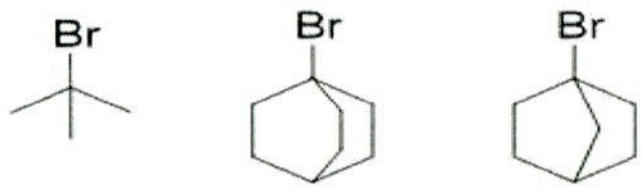
i) $(CH_3)_2C=CHCH_3$ is thermodynamically more stable than $Et(Me)C=CH_2$.

ii) N, N-dimethylaniline undergoes azo-coupling with PhN_2^+, while N,N,2,6-tetramethylaniline doesn't.

iii) The oxidation of $Ph_2C\underline{\mathbf{H}}OH$(benzhydrol) to $Ph_2C=O$ (benzophenone) exhibits a primary kinetic isotope effect, whereas the nitration of $C_6\underline{\mathbf{H}}_6$(benzene) to $C_6H_5NO_2$ (nitrobenzene) does not show a primary kinetic isotope effect for the C-**H** proton.

iv) Maleic acid is a stronger acid than fumaric acid.

v) Rate of solvolysis in the following compounds: **(5×2=10)**



Rate of solvolysis: 1 $\sim 10^{-6}$ $\sim 10^{-14}$

d) i) Under thermal conditions, will ring closure of (2E,4Z,6E)-octatriene be conrotatory or disrotatory? Draw Structures.

ii) Will the product have the cis or the trans configuration?

iii) Under photochemical conditions, will ring closure be conrotatory or disrotatory? Draw structures.

iv) Will the product have the cis or the trans configuration?

(3, 2, 3, 2 = 10)

SECTION - B

5. a) (i) Predict the product of the Claisen rearrangement of (a) allyl-3-^{14}C phenyl ether,

(b) 2,6-dimethylphenyl allyl-3-^{14}C ether. **(8)**

(ii) Quinoline is prepared by the Skraup reaction of aniline, glycerol, and nitrobenzene. Suggest a mechanism involving Michael addition of aniline to an α, β – unsaturated aldehyde, ring closure, and then dehydration and oxidation. **(10)**

b) Give structures of the products from the following condensations:

i) $p\text{-}CH_3C_6H_4CHO + (CH_3CH_2C(=O))_2O \xrightarrow{CH_3CH_2COONa}$

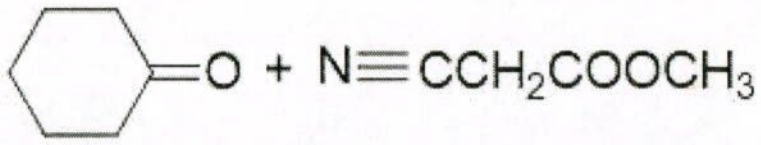
[Turn Over

ii) Cyclohexanone + $CH_3CH_2NO_2$ $\xrightarrow{OH^-}$

iii) $C_6H_5CHO + C_6H_5CH_2C{\equiv}N \xrightarrow{OH^-}$

iv) Benzophenone + Cyclopentadiene $\xrightarrow{OH^-}$

v) $CH_3COCH_3 + 2C_6H_5CHO \xrightarrow{OH^-}$

vi)  $\xrightarrow{CH_3COONH_4}$

(6×2=12)

c) Why does the treatment of α – methylallyl alcohol with $SOCl_2$ yield both a primary and a secondary chloride, and how does this support the proposed S_Ni mechanism? **(10)**

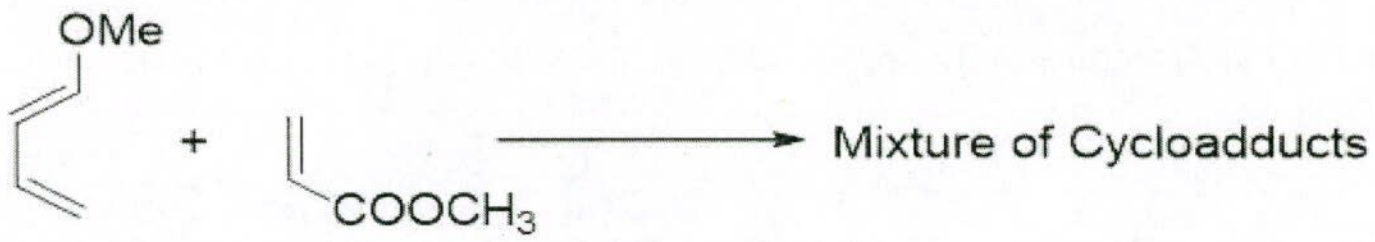
d) How many kinds of H's are there in the isomers of dimethylcyclopropane? **(10)**

6. a) Using C_6H_6, $C_6H_5CH_3$, via diazonium salts and other needed reagents, prepare (i)o-chlorotoluene, (ii) m-chlorotoluene, (iii) 1,3,5-tribromobenzene, (iv) m-bromochlorobenzene, (v) p-iodotoluene, (vi) p-dinitrobenzene, and vii) p-cyanobenzoic acid. Do not repeat the synthesis of intermediate products.**(7×5=35)**

b) Draw a reaction-enthalpy diagram for an exothermic two-step reaction in which (a) the first step is slow and (b) the second step is slow. Why do these reactions occur? Indicate R reactants, I intermediates, P products, TS transition states in the diagram. **(10)**

c) Account for the following observations (a) In the gas phase, the order of increasing basicity is $NH_3<CH_3NH_2<(CH_3)_2NH<(CH_3)_3N$. (b) In water, the order is $NH_3<CH_3NH_2=(CH_3)_3N<(CH_3)_2NH$. **(5)**

7. a) Consider the following Diels-Alder reaction between 1-methoxybutadiene and methyl acrylate:



i) Draw all possible constitutional isomers of the cycloadducts that could be formed in this reaction, clearly indicating the regiochemistry of addition.

ii) For the *major* constitutional isomer formed, draw all possible stereoisomers, clearly indicating the stereochemical relationships (syn/anti, endo/exo where applicable). Explain which stereoisomer(s) would be preferentially formed and why.

iii) Briefly discuss how changing the Lewis acid catalyst (e.g.,from no catalyst to $SnCl_4$) would affect the rate and potentially the selectivity (both regio-and stereo-) of this reaction. Explain your reasoning. **(5+10+5=20)**

b) Explain the formation of prominent ion peaks at m/e 72, 71, 57 and 43 in the mass spectrum of 2-methylbutane. Indicate the ion responsible for the base peak. **(10)**

c) Prepare 1-butanol from i) an alkene, ii) 1-chlorobutane, iii) 1-chloropropane and iv) ethyl bromide. **(2+2+3+3=10)**

d) i) Teflon and Nylon-6, 6 exhibit markedly different chemical resistance despite both being synthetic polymers. Analyze the fundamental structural features at the molecular level that account for these differences. Furthermore, discuss one specific application where the unique chemical resistance of Teflon is critical, and contrast it with an application where the mechanical properties of Nylon-6,6 are particularly advantageous. **(5)**

ii) Contrast the key stabilizing forces responsible for the secondary structure of a protein (specifically an α-helix) with those responsible for the secondary structure of DNA (the double helix). Briefly explain how a single nucleotide change in DNA can ultimately affect a protein's tertiary structure and function.**(5)**

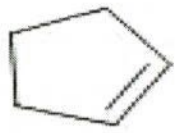
8. a) (i) Draw the structure of a compound with each of the following molecular formulae that will show only one PMR Signal: (i) $C_3H_6Cl_2$ (ii) C_5H_{12} (iii) C_4H_6 (iv) C_5H_{10}. **(4×2=8)**

(ii) Give the numbers of kinds of H's present in (a) CH_3CH_3, (b) $CH_3CH_2CH_3$, (c) $(CH_3)_2CHCH_2CH_3$ (d) $H_2C{=}CH_2$, (e) $CH_3CH{=}CH_2$, (f) $C_6H_5NO_2$, (g) $C_6H_5CH_3$ **(1+2+2+1+2+2+2=12)**

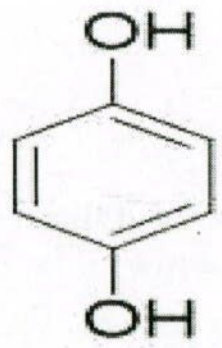
b) Give the structure of the products in each of the following reactions:

i) $CH_3CHO \xrightarrow{SeO_2}$

ii) $CH_3COCH_2CH_2COOC_2H_5 \xrightarrow{NaBH_4}$

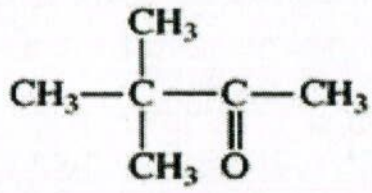
iii)  $\xrightarrow[\text{aq-alc } Na_2SO_3]{OsO_4}$

iv) $CH_2{=}CHCH_2CH_2N_3 \xrightarrow[\text{ether}]{LiAlH_4}$

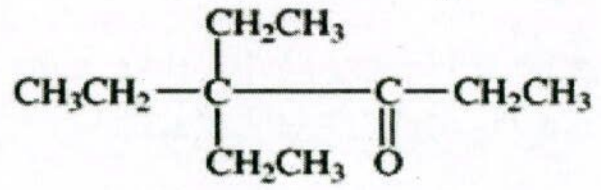
v)  $\xrightarrow{Pb(OAc)_4}$ **(5×3=15)**

c) Identify the substances (I) through (V) **(5×3=15)**

(i) (I) + $H_2 \xrightarrow{Pd(BaSO_4)}$ $(CH_3)_2CH{-}CHO$

(ii)  + NaOI ⟶ (II) + (III)

(iii) (IV) + $H_2O \xrightarrow{HgSO_4.\,H_2SO_4}$ 

(iv) (V) $\xrightarrow[-H_2O]{H_2SO_4}$ 

Total No. of Printed Pages-7]

CC(M)

CIVIL ENGINEERING

(OPTIONAL)

PAPER - II

[12]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

i) *There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in **All**. Question **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) *Your answer should be precise and coherent.*

iii) *For any typographical error, please read it as it appears in the question paper.*

iv) *Diagrams/Figures, may be drawn wherever required in the space provided.*

v) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*

vi) *No continuation sheets shall be provided to any candidate under any circumstances.*

vii) *No blank page should be left in between answers to various questions.*

viii) *Non Programmable Calculators are allowed.*

SECTION - A

1. a) Spot speed studies were carried out at a certain stretch of a highway and the consolidated data collected are given below.

Speed range Kmph	No. of vehicles observed
0-10	12
10-20	18
20-30	68
30-40	89
40-50	204
50-60	255
60-70	119
70-80	43
80-90	33
90-100	9

Determine (i) the upper and lower values or speed limits for regulation of mixed traffic flow and (ii) the design speed for checking the geometric design elements of the highway.

b) (i) Write a detailed note on track ballast. Also write the recommended ballast depth.

(ii) With a neat labelled sketch, write a note on points or turnouts.

(iii) Write a detailed note on sleeper density for railways.

c) A flag post of height 2 m was erected on top of a building. Find the RL of the top of the flag post, if the vertical angles to the bottom and top of it were measured using a theodolite as 7° and 10° respectively. A staff reading of 1.245 m was taken over a bench mark of + 100.00 with a vertical angle of 0°0'0".

d) Define Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). (i) Given that the 2-day and 4-day BOD values of a wastewater sample are 100 mg/L and 155 mg/L respectively, determine the BOD rate constant. (ii) If the ratio of 5-day BOD at 20°C to the ultimate BOD is 0.68, calculate the BOD reaction rate constant.

(15+15+10+10)

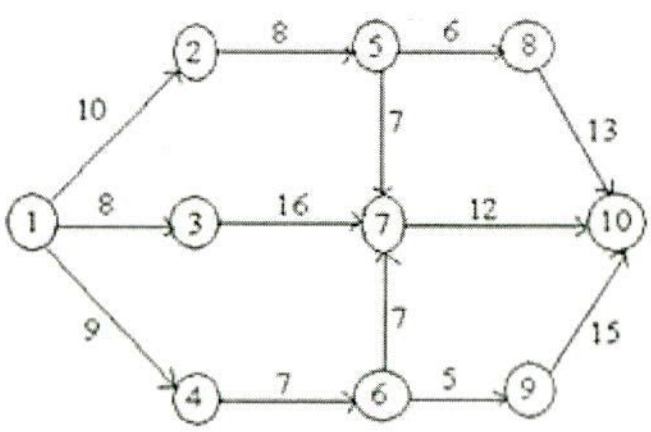
2. a) An irrigation canal serves a Gross Commanded Area (GCA) of 20,000 hectares, out of which 75% is the Cultivable Commanded Area (CCA). The intensity of irrigation is 40% for Rabi crops and 10% for rice. The core period is 4 weeks for Rabi and 2.5 weeks for rice. Given that the outlet factor is 1,800 hectares per cumec for Rabi and 775 hectares per cumec for rice, calculate: (i) The outlet discharge required for both Rabi and rice crops, and (ii) The delta for each crop (Rabi and rice).

b) Discuss the need for, manufacturing methods of, and primary applications for concrete hollow blocks and lightweight concrete blocks.

c) Determine the warping stresses at the interior edge and corner region in a 32 cm thick concrete pavement with transverse joints and longitudinal joints at 4.5 m and 3.6 m intervals respectively. The modulus of subgrade reaction is 6 kg/cm^2/cm. Assume the temperature differential for a day condition to be 15° C and radius of contact area is 15 cm. Additional data for cement concrete pavement is given below:

$e = 10*10^{-6}$ per °C; $E = 3*10^5$ kg/cm^2; $\mu = 0.15$; $C_x = 0.80$; $C_y = 0.45$.

d) Determine the early start and late start in respect of all node points and identify the critical path for the following network.



e) The scale of an aerial photograph is 1 cm = 150 m and the size of the photograph is 20 cm * 20 cm. Determine the number of photographs in each strip to cover an area of 15 km * 15 km if the longitudinal overlap is 70% and side overlap is 30 %.

(10+10+10+15+5)

3. a) At a right-angled intersection of two roads, Road I has four lanes with a total width of 12.0 m and Road 2 has two lanes with a total width of 6.6 m. The volume of traffic approaching the intersection during design hour are 900 and 743 PCU/hour on the two approaches of Road 1 and 278 and 180 PCU/hour on the two approaches of Road 2. Design the signal timings as per IRC guidelines.

b) In order to determine the elevation of top Q of a signal on a hill, observations were made from two stations P and R. The stations P, R and signal Q were on the same plane. If the angles of elevation of the top Q of the signal measured at P and R were 25°35' and 15°5' respectively, determine the elevation of the foot of the signal if the height of the signal above its base was 4 m. The staff readings upon the Bench Mark (RL 105.42 m) were respectively 2.755 m and 3.855 m when the instrument was at P and at R. The distance between P and R was 120 m.

c) Sketch and differentiate Ogee and chute spillways. **(20+10+5+15)**

d) A septic tank is to be designed for a colony of 200 people. The water supply is 180 liters per capita per day, and 80% of this is converted into sewage. The detention time in the septic tank is 36 hours. The sludge deposition rate is 0.03 m^3 per capita per year, and the cleaning interval is 15 months. The effluent is discharged into a dispersion trench system. Assume the percolation rate from the soil percolation test is 20 minutes per centimeter.
$q = 130/\text{sqrt}(T)$, where, q = sewage loading rate in liters/day/m^2 and T = Percolation time in minutes/cm.

Determine:

(i) The total volume of the septic tank (including sludge storage)

(ii) The total dispersion trench area required.

4. a) Define the following (with neat diagrams where applicable):

- Perched Aquifer
- S-Curve (in hydrograph analysis)
- Unit Hydrograph
- Flood Routing (through a channel or reservoir)
- Water-Logging: its causes, effects, and control methods

b) The average normal flow of traffic on cross roads A and B during design period are 364 and 250 pcu per hour; the saturation flow values on these roads are estimated as 1300 and 1100 pcu per hour respectively. The all-red time required for pedestrian crossing is 12 secs. Design two phase traffic signals by Webster's method.

c) Define admixtures and discuss the various types of concrete admixtures along with their functions and uses.

d) Define self-cleansing velocity and non-scouring velocity in the context of sewer design. Also, design the section of a combined circular sewer running full, using the following data:

- Area to be served: 150 hectares
- Population: 50,000
- Maximum permissible velocity: 3.2 m/s
- Time of entry: 5 minutes
- Time of flow: 20 minutes
- Rate of water supply: 270 liters/day/person
- Imperviousness factor: 0.45
- Assume 75% of the water supplied converts into sewage

Determine the required diameter and check if the flow velocity remains within permissible limits. **(20+10+10+10)**

SECTION-B

5. a) The following are the ordinates for a flood hydrograph resulting from an isolated storm of 6 hours duration.

Time (hr)	Ordinates of flood hydrograph (cumec)
0	5
12	15
24	40
36	80
48	60
60	50
72	25
84	15
96	5

Determine the ordinates of 1 cm-6hr unit hydrograph if the catchment area is 450 km^2.

b) Explain stretcher, rattrap, English, quetta and Flemish bonds with a neat diagram.

c) Explain the following terms in the context of surveying: (i) Least count (ii) closing error (iii) Arithmetic check (iv) Local attraction (v) Magnetic meridian and true meridian.

d) In the case of a gravity dam, uplift pressure is one of the major forces acting on the structure. Define and analyse the effect of uplift pressure on the total force acting on the dam under the following three conditions: (i) When there is no tailwater, (ii) When tailwater is present, and (iii) When tailwater is present and a drainage gallery is provided. Explain how the presence of tailwater and a drainage gallery influences the magnitude and distribution of uplift pressure and the resulting total force on the dam. **(15+10+5+20)**

6. a) Assume that a 2 floor residential building is proposed to be constructed. Identify various types of equipment that will be used in a series of steps in the construction process.

b) For a river valley project, the following results are obtained from flood frequency analysis using Gumbel's method:

Return Period (Years)	Peak Flood (m3/s)
50	28000
70	34000

Estimate the flood magnitude with a return period of 200 years.

c) An ascending gradient 1 in 60 meets a descending gradient of 1 in 50. Find the length of the summit vertical curve for a stopping sight distance of 180.

d) What are the common operational problems encountered in the activated sludge process, and how can they be identified and mitigated in a wastewater treatment plant?

e) During a three hour storm event, it was observed that all observed abstractions other than infiltration are negligible. The rainfall was idealised as 3 one hour storms of intensity, 10mm/h, 20mm/h, and 10mm/h, respectively, and the infiltration was idealised as a Horton curve, f=6.8+8.7 e ^(-t) (f in mm/h and t in hour). Find the total infiltration. **(10+15+10+10+5)**

7. a) Traffic flow in an urban area at right-angled intersection of two major roads in the design year are given below:

Approach Road	**Traffic Flow in PCU/hr**		
	Left Turning	Straight ahead	Right Turning
North	415	650	300
East	300	550	250
South	350	400	225
West	400	500	300

Both roads have a carriageway width of 15 m. Design and draw a Rotary Intersection and check for its practical capacity, making suitable assumptions as per IRC recommendations.

b) A drain carrying $7m^3/s$ of wastewater with its BOD of 90 mg/l joins a stream carrying 50 m^3/s flow with its BOD of 6 mg/l. What will be the value of the BOD of the combined flow after complete mixing? **(10+5+10+10+15)**

c) A water sample initially has a pH of 6 in the morning, which rises to 8 after 24 hours. Assuming a linear variation in hydrogen ion concentration, calculate the mean pH over the 24-hour period. Additionally, if the pH of the water sample is 9.25 at a certain time, calculate the hydroxide ion [OH^-] concentration in the sample.

d) Explain the various factors that affect the following: (i) Infiltration and (ii) Runoff

e) Using the geometric increase method and the incremental increase method, estimate the population of a town in the year 2011. The recorded populations (in thousands) are as follows:

Year	**Population (in thousands)**
1951	93
1961	111
1971	132
1981	161

8. a) What is diamond crossing on a railway track? What are block railway stations? Explain different types of block stations with neat diagrams of layouts.

b) Briefly discuss the following:

(i) Non Destructive testing Methods for concrete

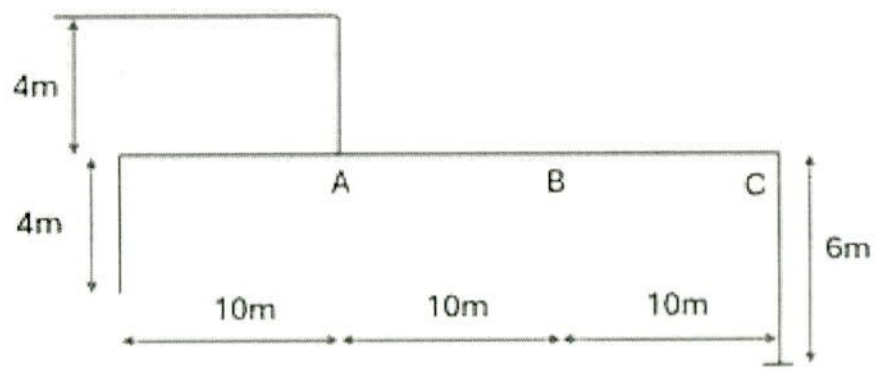
(ii) Crushing Test for aggregates

(iii) Creep of Concrete

c) A section line AB 300 m long on flat terrain measures 102.4 mm on the vertical photograph. A radio tower also appears in the photograph. The distance measured from the principal points to the image of the bottom and top of the radio tower found to be 7 cm and 8 cm respectively. The average elevation of the terrain was 553 m. Determine the height of the tower. Take f = 152.4 mm. **(10+15+5+10+10)**

d) Explain different types of foundations along with their features with neat sketches.

e) In the figure below, a section of a hydraulic structure found on sand is shown. Given the total head (H) is 4 meters and the specific gravity (G) of the floor material is 2.24, determine the following: (i) The average hydraulic gradient under the floor, (ii) The uplift pressure head at points A, B, and C along the downstream floor, (iii) The required thickness of the floor at points A, B, and C using Bligh's theory to counteract uplift pressure. (when no water on downstream and uplift pressure head (h) measured from the top of the floor, Design Thickness of floor = 4/3*h/(G-1)).



Total No. of Printed Pages-3]

CC(M)

COMMERCE AND ACCOUNTANCY

(OPTIONAL)

PAPER - II

[13]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

i) *There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt Five questions in all. Question **No.1** and **5** are compulsory and out of the remaining, any Three are to be attempted choosing at least **One** question from each Section. The number of marks carried by a question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) *Your answer should be precise and coherent.*

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v) *No continuation sheets shall be provided to any candidate under any circumstances.*

vi) *No blank page should be left in between answers to various questions.*

SECTION - A

1. Write short notes on the following: **(5×10=50)**

a) Transactional analysis. **(10)**

b) Quality of Work Life (QWL). **(10)**

c) Organizational structures. **(10)**

d) Power Structures. **(10)**

e) Conflict Management. **(10)**

2. a) "In contrast with the classical and neo-classical theories that focused on static and hierarchical structures, modern theories of organization view organizations as complex and dynamic systems that must adapt to their environment to survive and thrive". In the light of this statement, describe the modern theories of organization and discuss how they address the limitations of earlier perspectives. **(20)**

b) What is Management by Objectives (MBO)? Discuss the key aspects involved in its process and the advantages associated with this approach. **(15)**

c) What is a mission statement? How does the mission statement serve as a set of guiding principles for the formulation and execution of an organization's strategy? **(15)**

3. a) What do you understand by leadership style? Describe the various styles of leadership that may be adopted within an organization. **(20)**

b) What is organizational design? How do the contrasting organizational design approaches of centralization and decentralization impact key organizational functions? **(15)**

c) What do you understand by organizational culture? Describe some of the approaches for effective management of organizational culture. **(15)**

4. a) What is organizational behaviour? Describe the nature, scope and benefits of studying organizational behaviour. **(20)**

b) What is perception? Discuss the role of perception in an organisation. **(15)**

c) What is a Quality Circle (QC)? Discuss its importance in an organisation. **(15)**

SECTION - B

5. Write short notes on the following: **(5×10=50)**

a) Collective Bargaining. **(10)**

b) Job Enrichment. **(10)**

c) Strikes and Lockouts. **(10)**

d) 360 Degree Feedback. **(10)**

e) Workers' Participation in Management. **(10)**

6. a) What is human resource planning? Describe the objectives and importance of human resource planning in an organisation. **(20)**

b) Explain the significance of the selection process in Human Resource Management. Discuss various techniques employed by organizations for effective candidate selection. **(15)**

c) What is a performance appraisal? Discuss the objectives and benefits of performance appraisal. **(15)**

7. a) What do you understand by job analysis? Describe the various components and methods of job analysis. **(20)**

b) What is the significance of a well-designed promotion system for both employees and the organization. Describe the positive impacts of promotion decisions on employee morale and organizational performance. **(15)**

c) How are trade unions formed and registered in India? Discuss the obligations and rights of registered trade unions in India. **(15)**

8. a) What are the primary causes that typically trigger industrial disputes? Describe the statutory mechanisms established for the prevention and settlement of industrial disputes in India. **(20)**

b) Explain the process involved in implementing an employee transfer. Discuss the key considerations that must be observed by organizations to manage employee separations effectively and ethically. **(15)**

c) Describe the common causes of employee absenteeism and labour turnover within organizations. Discuss the potential negative consequences of high absenteeism and turnover in an organization. **(15)**

Total No. of Printed Pages-3]

CC(M)

ECONOMICS

(OPTIONAL)

PAPER - II

[14]

Time Allowed - Three Hours | ***Maximum Marks-250***

INSTRUCTIONS

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v) No continuation sheets shall be provided to any candidate under any circumstances.

vi) No blank page should be left in between answers to various questions.

SECTION - A

1. Answer the following questions in about 150 words. (5×10=50)

a) What is the Gadgil formula? Explain its role in resource allocation by Finance Commission.

b) Examine the de-industrialisation process witnessed during the Colonial India.

c) Discuss the broad objectives of NITI Ayog and its role as a vehicle of good governance and development planning.

d) What are the factors responsible for lopsided contribution of agriculture and industry to India's national income?

e) Explain the concepts of Gender Inequality Index and Multi - dimensional Poverty Index.

2. a) "Instead of resolving the distortions in agriculture, the agriculture price policy has aggravated them". Do you agree with this statement? Give reasons in support of your answer. **(20)**

b) Land Reforms in India were introduced to have more equitable distribution of land, but could achieve moderate success only. Examine the reasons. **(15)**

c) How do you explain the Conundrum or Paradox of free food being distributed to 800 million people by Central government despite rapidly falling poverty levels in India? **(15)**

3. a) Critically examine the recently announced disinvestment policy for the Public Sector Undertakings by the government. Will you justify the current policy regarding the use of disinvestment proceeds? **(20)**

b) "Labour regulations in India are supposed to be very rigid and complex". Comment. What policy measures do you suggest to help both the workers and employers? **(15)**

c) Analyse the sectoral composition of national Income and workforce participation in India. Do these changes reflect economic growth in India? **(15)**

4. a) What are the problems with Tariffs? Analyse the likely impact of the present full scale trade war going on between USA and China. How will it impact the US economy and Global economic scenario at large? **(20)**

b) Explain the causes behind inter regional variations in Human Development Indicators (HDI) in India. **(15)**

c) Discuss the importance of trade agreements, namely : TRIPS, TRIMS AND GATS. **(15)**

SECTION - B

5. Answer the following in about 150 words. **(5×10=50)**

a) Explain the dynamic method used in India to fix the prices of petroleum products. Why do these prices vary in different states across India? Are they covered by GST?

b) Explain the concept of Purchasing Power Parity (PPP). Where and how it is used? How PPP differ in short run and long run in case of exchange rate determination?

c) Analyse the concept of surplus in the economic thought of Physiocrats and Mercantilists.

d) Explain how 'India's intended Nationally determined contributions' are supporting the delivery of Sustainable Development Goals (SDGs)?

e) How Laffer Curve and Lorenz Curve are used in economic analysis? Explain using examples and appropriate diagrams for both.

6. a) What are the terms of reference and recommendations of the Fifteenth Finance Commission (FFC)? Do these address the concerns expressed by opposition ruled states in the light of wide differences in the population growth rates across states, fiscal federalism and fiscal consolidation? **(20)**

b) Discuss the relevance of FRBM Act and its impact on the fiscal freedom of the Union and State governments. **(15)**

c) Distinguish between the Structural Adjustment Policy of the World Bank and the Stabilisation policy of the IMF. **(15)**

7. a) "The Services Sector has not only out-performed other sectors of the Indian economy but also played an important role in the integration of Indian economy with the global economy, world trade and Capital markets". Discuss. **(20)**

b) Explain the concepts of "Repo Rate and Reverse Repo rate". Elaborate on how they can be used as effective monetary tools to spur the economic growth and control inflation? **(15)**

c) Examine the problems of rural and urban unemployment in India. Explain the recent trend in this regard using recent data. **(15)**

8. a) Analyse Foreign Direct Investment (FDI) Policy regime in India since 1991. Explain the channels of FDI. Discuss the role of MNCs in our growth process with examples. **(20)**

b) What was the significance of the 'Drain of Wealth' in Colonial India? How it affected the Balance of payments situation in the pre-independence period? **(15)**

c) Discuss the nature and causes of poverty in India. What measures, policies and programmes have been implemented by the government to reduce poverty during last two decades? **(15)**

Total No. of Printed Pages-7]

CC(M)

ELECTRICAL ENGINEERING

(OPTIONAL)

PAPER - II

[15]

Time Allowed - Three Hours | ***Maximum Marks-250***

INSTRUCTIONS

Please go through the following instructions carefully before attempting the paper.

*i) There are **Eight** questions divided in **Two** Sections, A and B candidate has to attempt **Five** questions in **All**. Question **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks assigned to a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer (QCA) Booklet in the space provided.*

ii) The answer should be precise and coherent.

iii) For any typographical error, please read it as it appears in the question paper.

iv) Diagrams/Figures,may be drawn wherever required in the space provided.

v) Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.

vi) No continuation sheets shall be provided to any candidate under any circumstances.

vii) No blank page should be left in between answers to various questions.

viii) Non Programmable Calculators are allowed.

SECTION - A

1. a) The closed loop transfer function of a unity feedback control system is given as **(10)**

$$\frac{C(s)}{R(s)} = \frac{2s+6}{(s^2+5s+6)}$$

Determine the steady state error for a unit ramp input.

b) An alternator is supplying a load of 350 kW at a power factor of 0.7 lagging. If the power factor is raised to unity, how many more kilowatts can alternator supply for the same kVA loading. **(10)**

c) Write minimum sequence of instructions to implement the following: **(10)**

i) Enable RST 6.5 interrupt without changing the state of the other interrupts and serial data.

ii) Return to the calling program without using RET instruction or Rcond instruction.

iii) Move the contents of (SP) to (D,E).

iv) Multiply 16-bit signed number in (B,C) register pair by 2 and store the result in the same register pair.

d) The inductance of a moving-iron instrument is given by $L = 8 + 4\theta - \frac{1}{2}\theta^2$ μH, where θ is the deflection from the zero position. The spring constant is 10×10^{-6} Nm/rad. Determine the deflection θ for a current of 5A. **(10)**

e) Consider a 10 kHz sinusoidal message signal which is sampled at 20,000 samples per second and fed as an input to a Delta Modulator (DM). If the step-size of the DM is $\Delta = 1$, determine the maximum amplitude of the message signal to avoid slope overload distortion. **(10)**

2. a) A full-load sinusoidal message signal is transmitted using binary Pulse-Code Modulation (PCM) scheme that includes a mid-rise type uniform quantizer with uniformly distributed quantization error. Considering a load of 1 ohm, the minimum required output signal-to-quantization noise ratio is 30 dB. Determine the minimum number of quantization levels and corresponding output signal-to-quantization noise ratio. **(20)**

b) A 132 kV overhead line has a series resistance and inductive reactance per phase per kilometre of 0.156 Ω and 0.4125 Ω, respectively. Calculate the magnitude of the sending end voltage, when delivering the full line capability of 125 MVA and the power factor is 0.9 lagging. The received voltage is 132 kV, for 16 km and 80 km lengths of line. **(20)**

c) A strain gauge has a nominal resistance of 600 Ω and a gauge factor of 2.5. The strain gauge is connected in a dc bridge with three other resistances of 600 Ω each. The bridge is excited by a 4 V battery. What would be the magnitude of the bridge output if the strain gauge is subjected to a strain of 100 μm/m. **(10)**

3. a) An overcurrent relay, rated as 5A, is connected through a 1000/5 current transformer. The relay has a plug setting of 150% and time multiplier setting of 0.8. The table below shows the operating time at various Plug-Setting Multiplier (PSM) corresponding to TMS=1. **(20)**

PSM	2	3	5	6	8	10
Operating Time (Sec)	5.0	3.0	1.8	1.5	1.2	1.0

For a fault current of 6 kA, determine the following

i) Relay pickup current

ii) Plug-setting multiplier

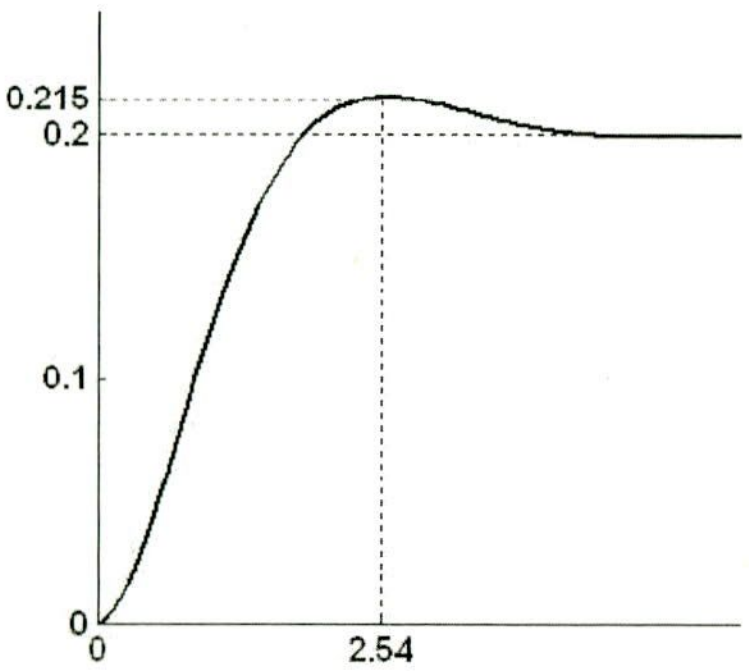
iii) Operating time of the relay.

b) A system is described by the following state equations, where u is the input and y is the output. **(20)**

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = -\frac{c}{a}x_1 - \frac{b}{a}x_2 + \frac{1}{a}u, \quad y = x_1$$

The input u is unit step, the output y is shown in figure. Determine the constants a, b and c.



c) N-positive (255< N < 65535) 8-bit unsigned numbers are stored in sequential memory locations starting from DATA. Write an assembly language program to obtain the largest and smallest numbers of the given block of data. Document your program properly. Draw the flow chart also. **(10)**

4. a) The autocorrelation function of a zero mean stationary random signal $x(n)$ is $R(k) = 0.5^{|k|}$. The signal *x(n)* is transmitted using differential pulse code modulation (DPCM) with an optimal second-order linear prediction filter $\hat{x}(n) = a_1 x(n-1) + a_2 x(n-2)$ which gives minimal variance of the residual error signal $e(n) = x(n) - \hat{x}(n)$. **(20)**

i) Find the values of the optimal predictor filter coefficients a_1 and a_2.

ii) Find the power of *e(n)* obtained after the optimal prediction filter.

b) The characteristic equation of a type-2 unity feedback system is. **(20)**

$$s^3 - 3s^2 + Ks + 3K = 0$$

Using Nyquist stability criterion, determine the number of closed loop poles on the RHS plane. Show all the steps and draw the relevant plots to obtain the solution.

c) A 200 MVA, two-pole, 50 Hz generator has a moment of inertia of 100×10^3 kg.m^2. Determine the inertia constant of the generator. **(10)**

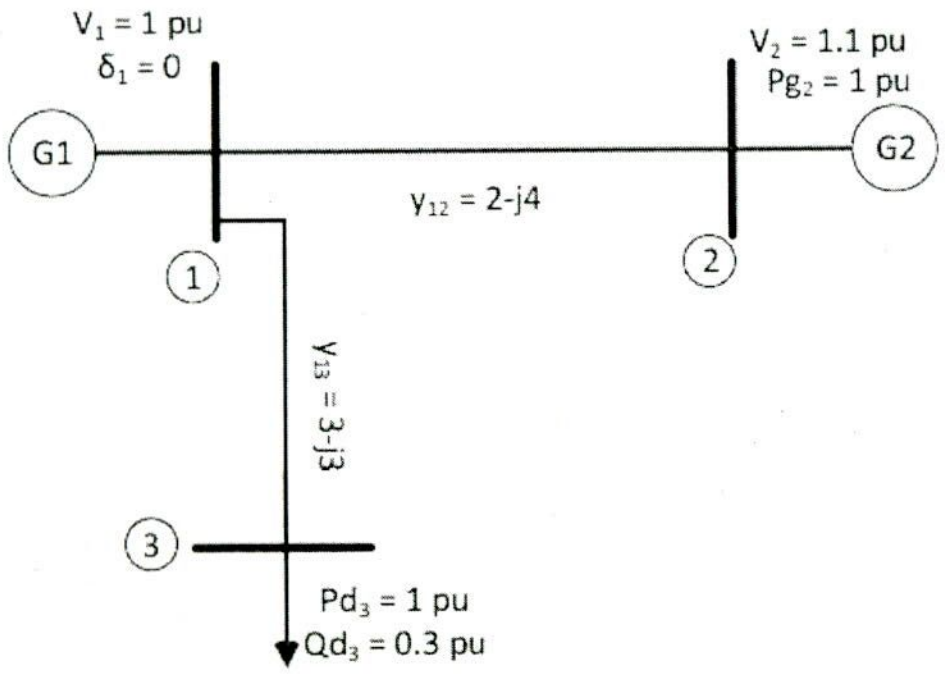
SECTION - B

5. a) A control system is described by the following state equations. Check the controllability of the system. **(10)**

$$\dot{x}_1 = x_1 + x_2 + u_1$$
$$\dot{x}_2 = x_2 + 5x_3$$
$$\dot{x}_3 = x_1 + 2x_2 + 4x_3 + u_2$$

b) A 3-phase, 11 kV, 10 MVA, star-connected generator is protected using the Merz-Price protection scheme. The current transformers (CTs) with a ratio of 1000/5 are placed at both ends of the stator windings. An internal fault near the neutral end of the stator winding causes 75% of the full-load current to flow through the CTs at the generator terminals and only 15% of the full-load current through the CTs at the neutral end. Determine the differential current seen by the protection relay. If the relay operating current is 0.5 A, will it trip in this condition? **(10)**

c) Obtain the bus admittance matrix (Y_{BUS}) for an electric power system as shown below. **(10)**



d) A wattmeter is connected to a single-phase circuit, whose supply voltage is 220 V and a load current is 20 A with 0.6 power factor. The current coil resistance of the Wattmeter is 0.05 Ω and a pressure coil resistance is 5000 Ω .Calculate the percentage error in wattmeter reading if the wattmeter is connected in the following configurations: **(10)**

i) The current coil is on the load side
ii) The pressure coil is on the load side.

e) Determine the average bit energy-to-two-sided noise power spectral density ratio in terms of inverse complementary error function, required to achieve a bit error probability of 10^{-5} for the coherent binary Amplitude Shift Keying (ASK) scheme. **(10)**

6. a) For a 132 kV, 50Hz system, the reactance and capacitance up to the location of the circuit breaker are 2.5 Ω and 0.02 μF , respectively. Calculate. **(20)**

i) Frequency of transient oscillation,
ii) Maximum value of restriking voltage across the circuit breaker contacts,
iii) Maximum value of rate of rise of restriking voltage.

b) Sketch the complete root locus plot for the feedback system with open loop transfer function. **(20)**

$$G(S)H(S) = \frac{K(s+0.5)}{s^2(s+4)}$$

When the parameter K is varied from 0 to ∞ .

c) Consider the following generator polynomial for a (7,3) cyclic code

$g(p) = p^4 + p^3 + p^2 + 1$

Determine the minimum distance (d_{min}) of the code. **(10)**

7. a) The fuel inputs per hour of plants 1 and 2 are given as **(20)**

$$F_1 = 0.2P_1^2 + 40P_1 + 120\frac{Rs}{hr}$$

$$F_2 = 0.5P_2^2 + 30P_2 + 150\frac{Rs}{hr}$$

i) Determine the economic operating schedule and the corresponding cost of generation if the maximum and minimum loading on each unit is 100 MW and 25 MW, respectively. The demand is 180 MW, and transmission losses are neglected.

ii) Determine the savings obtained by loading the units as per the economic operating schedule, i.e., the loadings obtained in (i), compared to the loading when both the units equally share the loads.

b) An 8085A Processor based system is to be developed using **one** 2764 EPROM, **two** 6264 RAM, one 8255A PPI and one 8253 PIT. The relevant control pins of these chips are given below: **(20)**

2764 EPROM (8kx8):	$\overline{OE}$,	$\overline{CE}$			
6264 RAM (8kx8):	$\overline{OE}$,	$\overline{CE}$,	$\overline{WE}$,		
8255A PPI:	$\overline{RD}$,	$\overline{WR}$	$\overline{CE}$,	A1, A0,	RESET
8253 PIT:	$\overline{RD}$,	$\overline{WR}$	$\overline{CE}$,	A1, A0,	

The peripheral devices are interfaced with the processor system bus using **memory mapped I/O.** Draw the neat connection diagram for interfacing these chips to the system bus. Use 3L × 8L decode having two active low and one active high enable inputs for decoding. Give the addresses of all memory chips and peripheral devices.

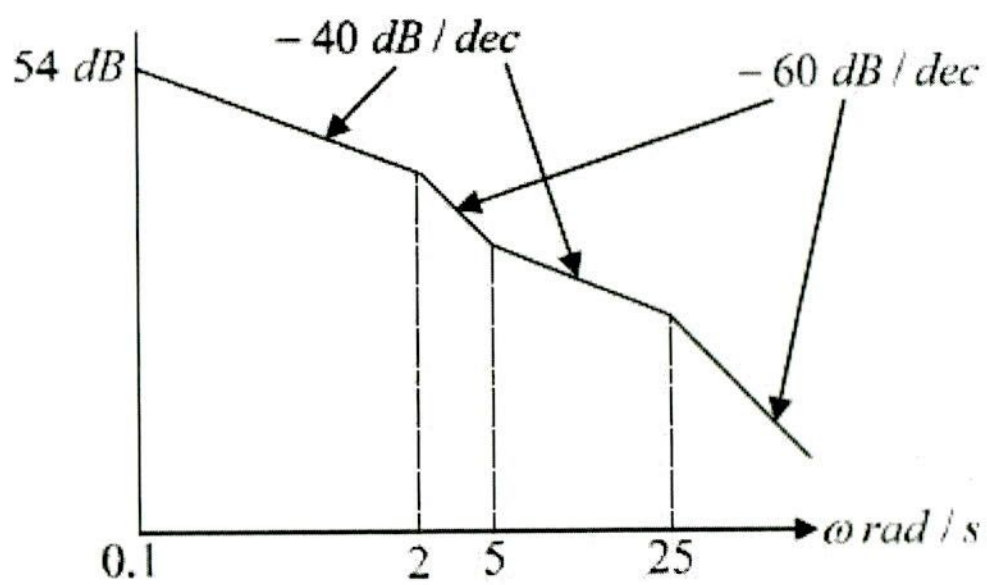
The developed system is used to interface 8-toggle switches through port A and 8-LEDs through port B of 8255A. A push button switch is used to generate an interrupt at RST 7.5. Write main program and interrupt service subroutine (ISR) in assembly language to read an 8-bit data from toggle switches and output its complement to 8-LEDs when push button is pressed.

c) The Secondary induced voltages of a LVDT at null position are $V_1 = 1.0V\angle 0^o$; $V_2 = 1.0V\angle 10^o$ respectively. Determine the null voltage of the LVDT.**(10)**

8. a) A 3-phase, 20 MVA, 10kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance (in Ω) per phase to be connected in series with the alternator so that the steady-state current on short-circuit does not exceed 8 times the full load current. **(20)**

b) Explain with a diagram the Schering bridge and derive the balance equations to measure capacitance and dissipation factor. What are the modifications needed in Schering bridge for measuring capacitance at higher voltages? **(20)**

c) The approximate Bode plot of a system is shown in the figure. Determine the transfer function of the system. **(10)**



Total No. of Printed Pages-4]

CC(M)

ENGLISH LITERATURE

(OPTIONAL)

PAPER - II

[33]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

*i) There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in All. Questions **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer (QCA) Booklet in the space provided.*

ii) Your answer should be precise and coherent.

iii) If you encounter any typographical error, please read it as it appears in the text book.

iv) Candidates are in their Own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.

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vi) No blank page should be left in between answers to various questions.

SECTION - A

1. Critically comment on the following passages in about 150 words each. (5×10=50)

i) Even so distant, I can taste the grief,
Bitter and sharp with stalks, he made you gulp.
The sun's occasional print, the brisk brief
Worry of wheels along the street outside
Where bridal London bows the other way,
And light, unanswerable and tall and wide,
Forbids the scar to heal, and drives
Shame out of hiding (Philip Larkin) **(10)**

ii) He said:
the river has water enough
to be poetic
about only once a year
and then
it carries away
in the first half-hour
three village houses,
a couple of cows
named Gopi and Brinda...(A.K.Ramanujan) **(10)**

iii) And running away, and wanting their liquor and women,
And the night-fires going out, and the lack of shelters,
And the cities hostile and the towns unfriendly
And the villages dirty and charging high prices:
A hard time we had of it.
At the end we preferred to travel all night,
Sleeping in snatches,
With the voices singing in our ears, saying
That this was all folly.(T.S.Eliot) **(10)**

iv) I sit in one of the dives
On Fifty-second Street
Uncertain and afraid
As the clever hopes expire
Of a low dishonest decade:
Waves of anger and fear
Circulate over the bright
And darkened lands of the earth,
Obsessing our private lives;
The unmentionable odour of death
Offends the September night (W.H.Auden) **(10)**

v) How can those terrified vague fingers push
The feathered glory from her loosening thighs?
And how can body, laid in that white rush,
But feel the strange heart beating where it lies?
A shudder in the loins engenders there
The broken wall, the burning roof and tower
And Agamemnon dead. (W.B. Yeats) **(10)**

2. a) Language is intrinsic to the human condition. Contextualise this with reference to Samuel Beckett's *Waiting for Godot.* **(20)**

b) Critically analyse W.B.Yeats's 'Lapis Lazuli' as a tragic narrative. **(15)**

c) *Look Back in Anger* is considered a landmark of post-war British theatre. Discuss with references from the text. **(15)**

3. a) Write a critical note on T.S.Eliot's use of religious symbolism in 'Burnt Norton' to articulate his idea of salvation and spirituality. **(20)**

b) Comment on the nature of time and space as articulated in Samuel Beckett's *Waiting for Godot.* **(15)**

c) Write an essay on the poetic worldview of Philip Larkin with reference to any two poems in your syllabus. **(15)**

4. a) Analyse critically John Osborne's *Look Back in Anger* as an autobiographical text. **(20)**

b) Critically comment on the structure of the poem 'In Memory of W.B.Yeats' by W.H.Auden. **(15)**

c) Comment on the representations of womanhood in A.K.Ramanujan's 'Of Mothers', 'Among Other Things' and 'Love Poem for a Wife'. **(15)**

SECTION - B

5. Write a brief note on the following in about 150 words each. **(5×10=50)**

a) Ethics of feminine Desire in D.H.Lawrence's *Sons and Lovers.* **(10)**

b) The title of E.M.Forster's *A Passage to India* . **(10)**

c) Virginia Woolf's *Mrs. Dalloway* as a modernist novel . **(10)**

d) Nationalist narrative in Raja Rao's *Kanthapura.* **(10)**

e) James Joyce's *A Portrait of the Artist as a Young Man* as a Bildungsroman. **(10)**

6. a) Write an essay on the politics of representation in E.M.Forster's *A Passage to India.* **(20)**

b) How does Virginia Woolf's narrative style in *Mrs. Dalloway* allow her to portray the conflicts of human experience? **(15)**

c) "It's not art for art's sake, it's art for my sake." In the light of this statement, offer a critical study of D.H.Lawrence's *Sons and Lovers.* **(15)**

7. a) How would you analyse Joseph Conrad's *Lord Jim* through the lens of imperialism? **(20)**

b) Contextualise notions of home, rootlessness, and dislocation to construct a diasporic consciousness in V.S. Naipaul's *A House for Mr. Biswas.* **(15)**

c) "It has all the content of an ancient Indian classic combined with a sharp, satirical wit and a clear understanding of the present". Discuss with reference to Raja Rao's *Kanthapura.* **(15)**

8. a) Write a critical note on the dialectics of feminist subjectivity in Virginia Woolf's *Mrs. Dalloway.* **(20)**

b) Examine critically Stephen Dedalus's modernist journey in James Joyce's *A Portrait of the Artist as a Young Man.* **(15)**

c) Offer an analysis of identity, the self and the 'other' in Joseph Conrad's *Lord Jim.* **(15)**

Total No. of Printed Pages-3]

CC(M)

GEOGRAPHY

(OPTIONAL)

PAPER - II

[16]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

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SECTION - A

1. a) On the outline map of India provided to you, mark the location of the following. Write in your QCA booklet the significance of these locations whether physical/ commercial/economic/ecological/environmental/cultural in news recently in not more than 30 words. **(10×2=20)**

i) Yankti Kuti Valley
ii) Sukapaika River
iii) Ziro valley
iv) Amrit Udyan
v) Yaya Tso Lake
vi) Tree Island
vii) Phalgu River
viii) Pamban Bridge
ix) Baila Dila
x) Morni Hills

b) Briefly discuss the salient features of the agro-climatic regions given by Planning Commission of India. **(10)**

c) Discuss the recent developments in information and communication technology and their impacts on strengthening rural economy. **(10)**

d) Discuss the impact of sea level rise to the island territories of India. **(10)**

2. a) Critically examine that why environmental impact assessment is mandatory for major development projects. **(20)**

b) Discuss the problems and prospects of the rural-urban fringe in the Indian context. **(15)**

c) Give an account of the demographic attributes of Indian population. **(15)**

3. a) Groundwater depletion is a cause of concerns. Give an account of distributions of groundwater resources of India. **(20)**

b) Describe the main physiographic division of India and explain the significance of coastal plains. **(15)**

c) Give an account of the major industrial corridors of India. **(15)**

4. a) Briefly discuss the mountainous region of the Himalayas with spatial references to national security. **(20)**

b) Appraise why flood is one of the most common climate extremes in India and how it impacts the life of human beings in Ganga Plains. **(15)**

c) Why there is sudden increase of automobile sectors? Discuss the growth, location and distribution of automobile industry in India. **(15)**

SECTION-B

5. Answer the following questions in 150 words **(5×10=50)**

a) Give an account of the commercial sources of energy in India.

b) What is X-band radar? Explain the uses of X-band radar.

c) SVAMITVA Scheme will transform the economy of rural India. Explain.

d) Discuss the benefits of the SPADEX mission to India.

e) What is cloud chamber? How it will help to study the Indian weather and climate.

6. a) Explain the benefits of the linkages of the rivers in India. Describe how it will reduce the water scarcity and increase the irrigation facilities in India. **(20)**

b) Discuss the problems and prospects of agro-based industries in Jammu and Kashmir. **(15)**

c) What is '*Anna Chakra*' and how it will help to reduce the food security problems in India. Comment. **(15)**

7. a) Discuss the major findings of the India State of Forest Report 2023. **(20)**

b) Discuss the future of the rainbow revolution in India. **(15)**

c) Urban waste is a major source of environmental degradation in India. Explain the suitable measures taken by the government to address this issue. **(15)**

8. a) Give an account of the increasing number of airway networks in India and their complementary roles in regional development. **(20)**

b) With suitable examples discuss the problems and prospects of over and under populated regions of India. **(15)**

c) Tourism is the backbone of economy of Jammu and Kashmir. Highlight the issues and challenges for its growth. **(15)**

Total No. of Printed Pages-3]

CC(M)

GEOLOGY

(OPTIONAL)

PAPER - II

[17]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. Answer the following in about 150 words each. (5×10=50)

a) Describe the methods used to determine the refractive index of a mineral grain in thin section, giving suitable examples. **(10)**

b) Define and describe index minerals and metamorphic zones. **(10)**

c) Discuss in brief the diagenesis of siliciclastic rocks. **(10)**

d) Explain the concept of provenance in sedimentology. Discuss how the study of conglomerates helps in determining provenance. **(10)**

e) Explain how Wulff Net is used to measure angles between crystal faces and represent stereographic projections. **(10)**

2. a) Describe crystallization of plagioclase feldspars using albite-anorthite system.Discuss conditions which may lead to zoning of plagioclases in magmatic rocks. **(20)**

b) Discuss the types of relict textures in metamorphic rocks. **(15)**

c) Discuss the ACF diagram showing the location of the ideal compositions of various common metamorphic minerals in a well labelled diagram. **(15)**

3. a) Discuss the factors affecting metamorphism. Describe the environment of metamorphism of green schist and blue schist facies with suitable sketches. **(20)**

b) Giving suitable examples, explain the different mechanisms of magmatic differentiation. **(15)**

c) How consideration of silicate tetrahedra and sharing of its oxygen/s is useful in classification of silicate minerals. Discuss with examples from important rock-forming minerals. **(15)**

4. a) Describe major sedimentary basins of India. Which of these are prospective for hydrocarbons? **(20)**

b) Describe holohedral classes of isometric, tetragonal and hexagonal systems with details of symmetry elements of each class. **(15)**

c) What are anorthosites? Describe theories describing origin of these rocks. **(15)**

SECTION - B

5. Answer the following in about 150 words each. (5×10=50)

a) Describe refractory minerals and their classification. **(10)**

b) Discuss the key features of the Environment Protection Act, 1986. **(10)**

c) Metasomatic replacement and residual concentration are two different processes of the formation of mineral deposits. Elaborate on each of them. **(10)**

d) Discuss the major sources of groundwater pollution and contamination. Briefly outline some of the methods for treating contaminated groundwater **(10)**

e) Discuss calculation of ore reserves by cross-section method. **(10)**

6. a) What are the chief ores of copper? Discuss the mode of occurrence and origin of copper. Add a note on the geological distribution of copper ore in India. **(20)**

b) What are the conditions necessary for the formation of petroleum? Discuss the surface and subsurface occurrences of petroleum. **(15)**

c) Explain Lindgren's classification of ore deposits. **(15)**

7. a) Discuss the various subsurface exploration methods used in mineral exploration. **(20)**

b) What is the relationship between elemental abundances in CI Chondrites and Sun (mainly photosphere) and what is its implication? **(15)**

c) Discuss the salient features of the National Mineral Policy of India, 2019. **(15)**

8. a) Do the hydropower projects have significant impact on environment? Discuss in detail with examples from Himalayas. Also discuss the strategies to minimize this impact. **(20)**

b) What are industrial minerals? Name an industrial mineral which is used in drilling fluid and as a binder besides its other uses. Describe one prominent deposit of this mineral. **(15)**

c) Discuss the phenomenon of polymorphism in minerals with suitable examples. How do temperature and pressure affect polymorphic transitions? **(15)**

Total No. of Printed Pages-4]

CC(M)

HINDI

(OPTIONAL)

PAPER - II

[34]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting questions.

*i) There are **EIGHT** questions divided in two Sections and printed in **HINDI.***

*ii) Candidate has to attempt **FIVE** questions in all.*

*iii) Questions No. **1** and **5** are compulsory and out of the remaining, **THREE** are to be attempted choosing at least **ONE** question from each Section.*

iv) The number of marks carried by a question/part is indicated against it.

v) Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.

vi) Word limit in questions, wherever specified, should be adhered to.

vii) Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

खंड–1

किन्ही दो अवतरणों की सप्रसंग व्याख्या कीजिए। (2×25=50)

1. क) प्रकृति के यौवन का श्रृंगार करेंगे कभी न बासी फूल,
मिलेंगे वे जाकर अति शीघ्र आह उत्सुक हैं उनकी धूल।
एक तुम,यह विस्तृत भू–खंड प्रकृति वैभव में भरा अमंद,
कर्म का भोग,भोग का कर्म,यही जड़ का चेतन–आनंद।

ख) जाने दो वह कवि–कल्पित था, मैंने तो भीषण जाड़ों में
नभ–चुंबी कैलाश शीर्ष पर,
महामेघ को झंझानिल से गरज–गरज भिड़ते देखा है,
बादल को घिरते देखा है

ग) लरिकाई का प्रेम, कहौ अलि, कैसे करिकै छूटत?
कहा कहौं ब्रजनाथ–चरित अब अंतरगति यों लूटत।।
चंचल चाल मनोहर चितवनि, वह मुसुकानि मंद धुनि गावत।
नटवर भेस नंदनंदन को वह विनोद गृह वन तें आवत।।
चरनकमल की सपथ करति हौं यह सँदेस मोहि विष सम लागत।
सूरदास मोहि निमिष न बिसरत मोहन मूरति सोवत जागत।।

घ) बेद न पुरान गान, जानौं न बिज्ञान ज्ञान;
ध्यान,धारना,समाधि,साधन प्रबीनता।
नाहिन बिराग,जोग,जाग,भाग, 'तुलसी' के,
दया–दान–दूबरो हौं,पाप ही की पीनता।
लोभ–मोह–काम–कोह–दोष कोष मो सो कौन?
कलि हू जो सीखि लई मेरियै मलीनता।
एक ही भरोसो राम रावरो कहावत हौं,
रावरे दयालु दीनबंधु, मेरी दीनता।।

2. क) वर्तमान संदर्भ में कबीर काव्य की प्रासंगिकता पर विचार कीजिए। (20)

ख) ''कामायनी' उज्ज्वल चेतना का सुन्दर इतिहास है''– स्पष्ट कीजिए। (15)

ग) 'बादल को घिरते देखा है' कविता के आधार पर नागार्जुन की काव्य संवेदना पर प्रकाश डालिए। (15)

3. क) 'राम की शक्ति पूजा' के राम आधुनिक मानव के प्रतीक हैं। क्यों और कैसे– स्पष्ट कीजिए। **(20)**

ख) बिहारी का काव्य प्रेम और सौन्दर्य का काव्य हैं–विचार कीजिए। **(15)**

ग) दिनकर की राष्ट्रीय चेतना पर प्रकाश डालिए। **(15)**

4. क) 'कवितावली' के उत्तर काण्ड में प्रतिबिम्बित युगीन यथार्थ का विश्लेषण कीजिए। **(20)**

ख) पद्मावत में लोक संस्कृति की अभिव्यक्ति हैं, उदहारण सहित स्पष्ट कीजिए। **(15)**

ग) ''सूरदास के काव्य में जितनी सहृदयता है उतनी वाग्विदग्धता भी है''–मूल्यांकन किजिए। **(15)**

खंड–2

किन्ही दो अवतरणों की सप्रसंग व्याख्या कीजिए। **(2×25=50)**

5. क) हम साहित्य को केवल मनोरंजन और विलासिता की वस्तु नहीं समझते। हमारी कसौटी पर वही साहित्य खरा उतरेगा, जिसमें उच्च चिन्तन हो,स्वाधीनता का भाव हो,सौन्दर्य का सार हो, सृजन की आत्मा हो,जीवन की सच्चाइयों का प्रकाश हो–जो हममें गति, संघर्ष और बेचैनी पैदा करे,सुलाये नहीं,क्योंकि अब और ज्यादा सोना मृत्यु का लक्षण है।

ख) कवित्व वर्णमय चित्र है, जो स्वर्गीय भावपूर्ण संगीत गाया करता है! अन्धकार का आलोक से, असत् का सत् से,जड़ का चेतन से,और बाह्य जगत् का अन्तर्जगत् से संबंध कौन कराती है? कविता ही न!

ग) जीवन का सुख दूसरों को सुखी करने में है, उनको लूटने में नहीं। बुरा न था आत्मसेवा,भोग और विलास। देव ने तुम्हें उस साधन से वञ्चित करके रास्ता खोल दिया है। यह सिद्धि प्राप्त करने में अगर कुछ कष्ट भी हो, तो ही क्यों हो? क्यों नही समझते, तुम्हें अन्याय से लड़ने का यह अवसर के सैनिक बनकर लड़ने में जो गौरव,जो उल्लास है,क्या उसे इतनी जल्द भूल गये?

घ) ''कला केवल उपकरण मात्र है,कला जीवन के लिये और उसकी पूर्ति में ही है। जीवन से विरक्ति और जीवन के उपकरण से अनुराग का क्या अर्थ?... किसी का जीवन अन्य की तृप्ति और जीवन की पूर्ति का साधन मात्र होकर रह जाय? वह जीवन सृष्टि में अपनी सार्थकता से, सृष्टि में नारी के जीवन की मौलिक सार्थकता से वंचित रह जाय? जैसे सेवा के साधन दास का जीवन!..... भयंकर प्रवंचना!''

6. क) '''गोदान' न केवल किसान जीवन का महाकाव्य है।,अपितु समूचे युग की व्यथा–कथा है''–विश्लेषित कीजिए। **(20)**

ख) 'दिव्या' उपन्यास के आधार पर यशपाल की रचना दृष्टि पर प्रकाश डालिए। **(15)**

ग) दलित विमर्श की दृष्टि से 'सद्गति' कहानी की समीक्षा कीजिए। **(15)**

7. क) 'भारत दुर्दशा' नाटक में निहित नवजागरण की चेतना को विश्लेषित कीजिए। **(20)**

ख) ''मैला आँचल में रेणु ने समकालीन यथार्थ का चित्रण किया है''–विवेचित कीजिए। **(15)**

ग) ''स्कंदगुप्त नाटक में अतीत की पृष्ठभूमि में वर्तमान का चित्रण किया गया है''–इस कथन की विवेचना कीजिए। **(15)**

8. क) एक राजनैतिक उपन्यास के रुप में महाभोज का विवेचन कीजिए। **(20)**

ख) 'सामान' कहानी के माध्यम से प्रयाग शुक्ल व्यक्ति के वस्तु हो जाने की त्रासदी को व्यक्त करते हैं–विश्लेषित कीजिए। **(15)**

ग) आधुनिक मनुष्य की त्रासदी को मोहन राकेश कालिदास, मल्लिका एवं विलोम के माध्यम से किस हद तक व्यक्त कर पाए हैं–विचार कीजिए। **(15)**

Total No. of Printed Pages-3]

CC(M)

HISTORY

(OPTIONAL)

PAPER - II

[18]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

i) *There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in all. Question **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) *Your answer should be precise and coherent.*

iii) *If you encounter any typographical error, please read it as it appears in the text book.*

iv) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*

v) *No continuation sheets shall be provided to any candidate under any circumstances.*

vi) *No blank page should be left in between answers to various questions.*

SECTION - A

1. Write short notes in not more than 150 words in each of the following. (5×10=50)

a) Explain the causes and significance of the Third Carnatic War (1757–1763) in the context of British-French rivalry in India.

b) What were the key factors that led to the British victory at the Battle of Plassey (1757)?

c) The Battle of Buxar (1764) was a decisive victory for the British East India Company. Analyse how the battle shifted the power balance between the British and the Mughal Empire in India.

d) How did the Third Anglo-Maratha War (1817-1818) impact the British policy of subsidiary alliance and their consolidation of power in India?

e) What were the key features of Pitt's India Act of 1784, and how did it change the governance of the East India Company in India?

2. a) "The Mahalwari system claimed to preserve traditional institutions but in practice undermined them." Examine this contradiction in the colonial land revenue system. **(20)**

b) How did the commercialisation of agriculture under colonial rule restructure rural class relations and deepen India's economic dependence? **(15)**

c) To what extent was the 'Drain of Wealth' theory a political tool rather than an economic analysis in the nationalist discourse? **(15)**

3. a) Analyse how the peasant movements of the interwar years(1919-1939) negotiated between nationalism and agrarian radicalism. **(20)**

b) Was Gandhian nationalism more a moral intervention than a mass political strategy? Critically assess with examples. **(15)**

c) The Quit India Movement was both a moment of crisis and consolidation for Indian nationalism. Do you agree? Justify. **(15)**

4. a) To what extent did the linguistic reorganisation of states alter the balance between regional identity and national integration in post-colonial India? **(20)**

b) Evaluate the impact of the Five-Year Plans on inter-state development disparities and the emergence of regional political aspirations. **(15)**

c) Discuss the administrative, diplomatic and strategic measures adopted to integrate the princely states into the Indian Union after 1947. **(15)**

SECTION - B

5. Write short notes in not more than 150 words in each of the following. (5×10=50)

a) How did Rousseau's ideas challenge the foundations of absolutist political thought during the Enlightenment?

b) Analyse the role of Cavour and Garibaldi in the unification of Italy. How did their methods differ?

c) Evaluate the impact of colonial education policies on socio-political transformations in South Asia.

d) How did Bandung Conference (1955) reflect the assertion of the newly independent nations of the Third World?

e) Examine how the Enlightenment ideals influenced emerging concepts of citizenship and rights.

6. a) "The English Industrial Revolution transformed Britain from a mercantile power to an industrial empire." Analyse this transformation in economic and imperial terms. **(20)**

b) To what extent did the Meiji Restoration represent a successful synthesis of Western industrial practices and Japanese traditions? **(15)**

c) Evaluate the relationship between industrialisation and the emergence of modern globalisation in the 19th and 20th centuries. **(15)**

7. a) "The Chinese Revolution of 1949 was as much about rural mobilisation as it was about Communist ideology." Examine with reference to Maoist strategy. **(20)**

b) Was the Russian Revolution of 1917 a spontaneous popular upheaval or a calculated seizure of power by a political vanguard? **(15)**

c) Assess how the consequences of World War II influenced the decolonisation process and the bipolar global order. **(15)**

8. a) Examine the structural weaknesses of the Soviet system that led to the collapse of communism in Eastern Europe and the USSR. **(20)**

b) How did the diplomatic recalibration and economic pressures of the 1980s contribute to the end of the Cold War? **(15)**

c) Analyse the factors behind the United States' strategic ascendancy in the post-Cold War global order. Was it hegemony by design or by default? **(15)**

CC(M)
KASHMIRI
(OPTIONAL)
PAPER - II
[35]

Maximum Marks -250

Time Allowed - Three Hours

(Answer Must be Written in Kashmiri)

جواب دِنہٕ بڑٕ وٚنہٕ پُرٕ وسوالن متعلق خاص ہِدایت

1. یَتھ پرچس چھِ اَٹھ سوال یم دون حِصن (سکیشن) پٮ۪ٹھ مشتمل چھِ۔
2. توہہِ چھِ کُل پأنزٕن سواٲلن ہِنٛدی جواب دِنی۔
3. سوال نمبر 1 (اَکھ) تہٕ سوال نمبر 5 (پانزٕھ) گَرٕنی چھِ لأزمی۔
4. دو یو سیکشنو مٹز چھِ باقی ترٕ ہن سوالن ہِنٛدی جواب دِنی۔ مگر دوٚشوٕ سیکشن کیو سوالو مٹز چھِ کم کھوتہٕ کم اکہِ سوالُک جواب دیُن ضرٛوٗری۔ پرٛتھ سوالس تہٕ سوالِکس حِصس بڑٕ وٚنہٕ کنہِ چھِ نمبر (Marks) درٕج گَرنہٕ آمتی۔
5. سوالن ہِنٛدی جواب دِنہٕ باپتھ چھُ لفظن ہُنٛد تعداد مُقرر کرنہٕ آمُت۔ اچ پابندی گَرٕنی چھٕے لأزمی۔
6. سوالن ہِنٛدٕ ہن جواب پیہِ ترتیب وار اہمیت دِنہٕ۔
7. اگر کُنہِ سوالُک یا تمہِ کہِ کُنہِ حِصُک لیکھنہٕ آمُت جواب توٚ ہی مُجرا چھونہٕ یژھان تھاوُن، تتھ گٔرٛھِ کرٕ اس دیُن۔ نتہٕ پیہِ سُہ جواب تصوٗر کرنہٕ۔ یوٚ دوَے سُہ جواب اڈٕلیوٚ کُے تہٕ آسہِ۔
8. کانٛہہ صفحہ یا صفحُک حِصہٕ اگر خألی روزِ تتھ گٔرٛھِ کرٕ اس دیُن۔

SECTION - A

1. بوٚنہٕ کنہِ دِنہٕ آمتنہٕ شعرنٕ کُرِ وتشریح تہٕ شأعرسُنٕدٕ حوالہٕ دِتھ ہیوٚ شعری اسلوٗبس سام۔ **(5×10=50)**

(أِلف) سہزٕس شم تہٕ دم نو گژھے — یژھ نو پژ وا کھ مکُتی دوار

سِللس لوٗن زن میلتھ گژھکھ — توتہِ چھُے دورلب سہزٕ ویژار **(10)**

(ب) بگہ ژٕے تہِ کل گیی میأنی — گوسَے بہٕ گُلی گُلی ژٕمتھ کتھ

اِدِ وونی بہٕ تہِ کل تژٕ اِو چأنی — یام ہأ ٹکل گژھم ژٕمَتھ کتھ **(10)**

(ج) رژٕھِ رژٕھِ رہتہٕ کول آم سورانے — بِر ما گژھن أچھ پوش

کُنہِ ہتہٕ بُلبُلہٕ یتہٕ اکہِ آنے — چھاومیأنی دانے پوش **(10)**

(د) یتھ سرس سِری پھوٚل ناویژے — تتھ سرس سکلو پونی چیٚن

مرگ، سبزٕ گال، گُنڈی، زلہٕ ہُستی — زیٚن نازیٚن تہٕ توٚتے پیٚن **(10)**

(ہ) نُندین ءستہٕ سنٛز کران ژٕسی زے — زن دِزے شاہ وُ لگے کسنز

ڈٹھین ءستہٕ سنٛز کران ژٕسی زے — زانہہ أژی زے نہٕ تمنین بانن منٛز **(10)**

2. یمن سوالن ہُنٕد جواب دِیو۔ **(50)**

(أِلف) محمو دگأمی ہنٛز ''تمثیل آدم'' وژن نُما نظمہِ ہُنٕد تنقیدی جأیز لیکھو۔(200 لفظن منٛز) **(20)**

(ب) ''رسُل میر چھُ پننہِ دورُک اکھ بأغی شأعر'' بیانس ءستی اِتفاق کران کُرِ وواضح۔(200 لفظن منٛز) **(20)**

(ج) سوچھِ کرال ہنٛزِ ''دپیومس تہ دوٗ پنم'' نظمہِ ہنٛز موضوٗعی سام ہیٚو۔(100 لفظن منٛز) **(10)**

3. یمن سوالن ہُنٕد جواب لیکھو۔ **(50)**

(أِلف) مہجو رہنٛز ''وُزمل'' نظمہِ ہنٛز فنی خصوٗصیٚژ گاشرأ وِو۔(200 لفظن منٛز) **(20)**

(ب) راہی ہنٛز ''صدا'' نظمہِ ہُنٕد تھیمیایی مُطالعہ کُرِ و۔(200 لفظن منٛز) **(20)**

(ج) ''پرٕینی شاہراہ'' نظمہِ منٛز کیاہ چھُ شأعِر ونُن یژھان؟ واضح کُرِ و(100 لفظن منٛز) **(10)**

4. یمن سوالن ہُنٛد جواب لیکھو۔ (50)

(اَلف) کاشِر زبانی ہِنٛدِس ادبی تحقیقس تہٕ تنقیدس کیٚاہ چھُ آزاد سُنٛد دیُت؟ واضح کٔرِو۔ (200 لفظن منٛز) (20)

(ب) محمد یوسف ٹینگ سٕنٛز تنقیدی زبانی پٮٹھ لیکھو نوٹ۔ (200 لفظن منٛز) (20)

(ج) کاشِرس منٛز کیٚا زٕچھُ شعری تنقیدس مُقابلہ افسانوی ادبٕک تنقید کم؟ (100 لفظن منٛز) (10)

SECTION - B

5. یونہٕ کنہِ دِنہٕ آٮتین نثری اقتباس ہِنٛز کٔرِو تشریح تہٕ فنی پہلو ہن وٚضاحٕ وِو۔ (50)

(اَلف) تٕمی آسہٕ پانٛز ہ اَٹھ جماٗ ژٕپرِ مٕژ۔ سُہ اوس تٕمنٕے ہُنٛد وِو ہاریژھان کٔرُن۔ سُہ اوس یمن ژون کوہن منٛز باگ پاں ڈلس منٛز بند ہیوٚ گوٚ مُت۔ سُہ اوس نیٚبِرم دُنیا یژھان وُچھُن۔ تس اوس اَسُن یِوان امایم میمہٕ تہٕ صحب کیٚاہ وُچھنہِ چھِ کٔشیرِ یِوان؟ یِہنٛد ہن مُلکن منٛز ریلہٕ، جہاز، کارخانہٕ، بم جنگ تہٕ بیٚیہِ تہٕ واریاہ چیز چھِ۔ بیٚتہِ کیٚاہ چھُ۔ شِکس۔ کوہ اَنٛدی اَنٛدی تہٕ منٛز باگ یہِ ڈل، وٗنٛدی وٗنٛدس پیٚوان آسان۔ کٔہی تام اکھ باز رُوچھُن لایق۔ (10)

(ب) پٲنی پانس ہٕستی کوٚ رُم انٛدری اَسُنا۔ کیٚنژھا اَمی ہِنٛدِس سیٚزرس پزرس پٮٹھ۔ کیٚنژھا پنہٕ نِس ژھلس پٮٹھ۔ دۄیمہِ دوہ صُجن اۄنُن دوہ داڈ سیرا۔ پاو چوونس بہٕ۔ پاوِاَ کِس منٛز بوٚ ڈروٗن ژٕنہِ پھوٚل تہٕ اکی شاہ چون سورٕے دوہ۔ یی کران کران گوٚ وہفتہ۔ اۄ تا متھ اوس اَمِس ترٕ یٚمہِ ژۄ رمہِ دوہ غش یِوان۔ گٕتہِ گژھان۔ دنٛد ٹکران۔ مگر وونی اَسی ستھ دوہ تہٕ گاٗمتی۔ دوہ اوس نہٕ کُنی۔ ژٕنہِ پھوٚل ہیوٚ تُن دوہ دس منٛز وارِ وارِ گلُن۔ (10)

(ج) کاش یہِ آسہِ ہے پُزی پاٗٹھی اکھ خاب۔ بہ بیٚوٚتھُس پانس ہٕستی سوچنہِ۔ مگر آسہِ ہے کیٚاہ گوٚ و؟ یہِ چھُ پُزی پاٗٹھی اکھ خاب۔ سامی جِین وۄن نہٕ کہینٛی تہٕ غلط۔ یہِ نے سوپنہِ مایا چھےٚ اَدِ کیٚاہ چھےٚ؟ نی تون یو ہے سامی جی تہٕ یو ہے مکھنہِ۔ ازبرٕ وٚنہ کتہِ زانہکھ بہٕ یم۔ مگر وُنی کبن چھُ میٚون سمسار یمنے دۄن تام موژ یومُت۔ پگاہ یٚلہِ بہٕ گٕرِ واتہٕ۔ یا سامی جی نہِ کتھ ہُشار گژھ یمن ہُنٛد وجوٗ دکتہِ روزِ؟ (10)

(د) دِل پھُٹنہِ گوس رتھ باندِ۔ وُ پھنگ تو انگر گوس ختم۔ تہٕ پُزی راٗوس پہچان۔ تُر کیو وۄنُس زِ اتھ چھےٚ دٕرِ کہٕ علاج۔ پوٚ زدٕرِ کہٕ گٕری اَسی کرتام بُستی ترٕ اَوتھ ژٕلی ہٕتی۔ تِکیٚا زِ وونی اوس نہٕ بستی منٛز کاٗنسہِ رتھ باندِ گژھان۔ تیٚوٚت خوٚن اوسُے نہٕ کاٗنسہِ۔ سُہ اوس شاید وولہرش وۄتھنہِ وِزِ چھکنہِ آمُت۔ خاکس منٛز جذب گوٚ مُت تہٕ باقی یہِ کیٚنژھا رۄ دمُت اوس تٕمی اوس رنگےٚ بدلو مُت۔ انہار تہِ تبدیل کوٚ رمُت۔ تھٕکتھ ژٕنو تٕمی سُہ اَنگےٚ یتھ رتھ باندِ اوس گوٚ مُت۔ (10)

(ہ) وارِ وارِ سوتیہٕ آوازتہٕ باسیٚو وریل گاڑِ آیہٕ پکھٕ تہٕ ہیٚوتُن وُڑُن ۔ أ کِس گڑٕ دٕسنٛدی پأٹھی ۔ گوٹی وأ لی نفرن دۆپ لب خنٛدٕ کُرِتھ پانس ٕستی ۔ یہ گڑٕ دوا تناوِنہ اَسہٕ مازلو تھرن بالہٕ اپورمنٛزِلس ۔ یہ کھیٚیہٕ اَسہٕ بالہ تھوٚنگِس پیٹھ تہٕ سأنی أڑجہٕ کرٕ نٛزتٕ اوِتی ۔ کنٛڈ کٹرن کوٚ رلہنگہ واجنین زنانن تھوٚ دوتھنہ باپتھ اِشارٕ ۔ تم ۆ ژھ تھوٚ د ۔ نژن گڑٕ اے دِتھ ہود کنٛڈ کٹرن تمن اتھو ٕستی زِنٛژو ۔ زنانو گنٛجہٕ شاید رونہٕ ۔ نہٕ تمن أ سی رونہٕ گوڈلأ گتھے ۔ تہٕ ہیٚو تُکھ کنٛڈ کٹرس ٕستی ٕستی آرٕ کونڈل کُرِتھ نژُن ۔ **(10)**

6. یمن سوالن ہُنٛد جواب لیکھو ۔ **(50)**

(أِلف) ''یتھ رازدائے'' افسانٛک تنقیدی جأیز لیکھو ۔ (200 لفظن منٛز) **(20)**

(ب) ''مُجرم'' ناولہٕ منٛز کُس چھُ اَصل مُجرِم ۔ واضح کُرو ۔ (200 لفظن منٛز) **(20)**

(ج) ''اِوان ایلچ'' ٕسنٛدِ کِردارٕک مُقابلہٕ کُرو ''گڑٕ اِسم'' ٕسنٛدِس کِردار ٕستی ۔ (100 لفظن منٛز) **(10)**

7. یمن سوالن ہُنٛد جواب لیکھو ۔ **(50)**

(أِلف) ''ناٹک کُرِ وبنٛد'' ڈڑٕ امہس منٛز کتھ پیٹھ چھُ طنز کرنہٕ آمُت ؟ واضح کُرِو ۔ (200 لفظن منٛز) **(20)**

(ب) ''ایڈیپس'' ڈڑٕ اماچہٕ فنی خصوٚصیٚژ وبژھنأوِو ۔ (200 لفظن منٛز) **(15)**

(ج) ''کالج پأتھر'' اوک أنگی ناٹکٕک تنقیدی جأیز لیکھو ۔ (100 لفظن منٛز) **(15)**

8. یمن سوالن ہُنٛد جواب لیکھو ۔ **(50)**

(أِلف) کأشرِ لکہٕ شأعری چھےٚ کأشر بن رسمن ہنٛز دستاویز ۔ اِتفاق کران وبژھنأوِو ۔ (200 لفظن منٛز) **(20)**

(ب) ''کأشرِ لکہٕ شأعری منٛز کأشرِ زنانہٕ ہنٛز تصویر'' عنوانس پیٹھ لیکھو نوٹ ۔ (200 لفظن منٛز) **(20)**

(ج) بانڈٕ پأتھرس منٛز کیٰاہ چھےٚ مسترٕ ٕسنٛز اہمیت ؟ (100 لفظن منٛز) **(10)**

Total No. of Printed Pages-3]

CC(M)

LAW

(OPTIONAL)

PAPER - II

[19]

Time Allowed - Three Hours	***Maximum Marks-250***

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

*i) There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in all. Question **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

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vi) No blank page should be left in between answers to various questions.

SECTION-A

1. Answer the following questions in about 150 words each. Support your answer with relevant legislative provisions and judicial pronouncements. (5×10=50)

a) "*Actus non facit reum nisi mens sit rea*". Explain the relevance of this maxim in criminal law and the exceptions to this maxim, if any.

b) Discuss Community Service as a punishment under the Criminal law.

c) What is a petty organized Crime? Explain with the help of examples.

d) How has consumer law changed from Caveat Emptor to Caveat Venditor? Explain.

e) When is 'unlawful compulsory labour' deemed to be a practice of untouchability?

2. a) The Bharatiya Nyaya Sanhita, 2023, introduced a new offence of Mob Lynching. Discuss the essential ingredients of the offence citing relevant case law and distinguishing it from other homicide with the help of the relevant sections of the Bharatiya Nyaya Sanhita, 2023. **(20)**

b) What are the various tests applied for determining whether an act amounts to attempt, or is it a mere preparation to commit an offence? Discuss. **(15)**

c) Analyse the changes introduced in the provisions relating to Kidnapping under the Criminal law? What would be the impact of this change? **(15)**

3. a) The Bharatiya Nyaya Sanhita, 2023 (BNS) has been regarded as a step towards decolonizing India's criminal laws. One such offence with colonial import was that of Sedition, as under Section 124A of the Indian Penal Code, 1860, under Offences Against the State. The BNS omits the offence of Sedition and replaces it with Section 152, "Act endangering the sovereignty, unity and integrity of India." In light of the above statement, critically evaluate the Offences Against the State under BNS compared to the Indian Penal Code, 1860. Further, discuss the extent of reconciliation between civil liberties and national security under these provisions. **(20)**

b) When does theft amount to snatching? Explain with the help of relevant legislative provision. **(15)**

c) The Prevention of Corruption Act, 1988 (PC Act), is a comprehensive legislation aimed at curbing corruption in public life. However, India's ranking of 96 out of 180 countries in the recently published Corruption Perceptions Index (CPI), 2024, indicates a failure to achieve the Act's intended objectives. Critically evaluate the PC Act and suggest measures to effectively combat corruption in public life. **(15)**

4. a) Discuss the various kinds of damages that may be awarded to a plaintiff under the law of torts? **(20)**

b) When can the State be held liable for Torts committed by its servants? Are there any exceptions to this? Explain. **(15)**

c) Discuss negligence as a Tort in the light of important judgments and principles relating to duty to care? Can contributory negligence be claimed as a defence? **(15)**

SECTION-B

5. Answer the following questions in about 150 words each. Support your answer with relevant legislative provisions and judicial pronouncements. (5×10=50)

a) All contracts are agreements, but all agreements are not contracts. Explain.

b) What is emergency arbitration?

c) Discuss the exceptions to 'privity of contract'.

d) Discuss the significance of Safe Harbour Clause under the IT Act, 2000

e) "Mistake does not defeat consent but only misleads the parties". Explain.

6. a) What is the essence of the doctrine of stifling of prosecution? Explain the ratio decidendi in the Union Carbide Corporation v. Union of India, AIR 1992 SC 248 and give your opinion on the court verdict. **(20)**

b) Explain the concepts of 'abuse of dominance' and 'abusive conduct' as prohibited under the provisions of the Competition Act, 2002. **(15)**

c) Critically analyse the law relating to passing off risk under the Sale of Goods Act,1930. **(15)**

7. a) What are the essentials of an agency? What are the conditions for creation and termination of agency? Discuss. **(20)**

b) Analyse the benefits that accrue to registered proprietors and authorized users by registration of Geographical Indications of Goods. **(15)**

c) Explain the merits and demerits of media trial with the help of examples. How does it intersect with fair trial? Discuss. **(15)**

8. a) How has the concept of public interest litigation been instrumental in protection of environment in India? Discuss with the help of judicial decisions. **(20)**

b) What is the doctrine of unjust enrichment? Also discuss the concept and types of quasi contracts under the Indian Contract Act, 1872. **(15)**

c) What types of information are exempted from disclosure under the Right to Information Act? When can such information be disclosed? **(15)**

Total No. of Printed Pages-03]

CC(M)

MANAGEMENT

(OPTIONAL)

PAPER - II

[20]

Time Allowed - Three Hours	*Maximum Marks - 250*

INSTRUCTIONS

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SECTION - A

1. Describe the following in about 150 words each. **(5×10=50)**

a) Distinguish between census and sample survey methods of collecting samples. Mention the merits and demerits of the census method. **(10)**

b) Discuss any five inventory control techniques. **(10)**

c) What are sampling errors? Discuss any five sampling errors. **(10)**

d) Briefly explain the Six Sigma concept. **(10)**

e) What do you mean by Enterprise Resource Planning (ERP)? What are its components? **(10)**

2. a) What do you understand by time series analysis? What are the four main components of a time series? Briefly explain the methods of fitting a trend line. **(20)**

b) Briefly explain the following in the context of decision making under certainty: **(5+5+5=15)**

i) The Maximax rule

ii) The Maximin rule

iii) The Minimax rule

c) Answer the following questions based on probability analysis: **(5+5+5=15)**

i) A jar contains 3 red, 4 blue, and 5 green marbles. What is the probability of randomly drawing a red marble?

ii) From a deck of 52 cards, what is the probability of drawing an ace or a king?

iii) A dice is rolled. What is the probability that an even number has been obtained?

3. a) Discuss the meaning and pillars of a world-class manufacturing system. **(20)**

b) Define the term waste management. Describe the waste management techniques. **(15)**

c) What is Material Management? What are its objectives? **(15)**

4. a) What are the emerging trends in the Information Technology sector? **(20)**

b) What is data management, and why is it essential? **(15)**

c) What do you mean by e-governance? Discuss the e-governance initiatives of the Government of India. **(15)**

SECTION - B

5. Describe the following in about 150 words each **(5×10=50)**

a) Briefly discuss various types of cybercrimes. **(10)**

b) Write a short note on turnaround management. **(10)**

c) Discuss the role of the state in a mixed economy. **(10)**

d) Elucidate the concept of core competence in business. **(10)**

e) What are the various sources of finance for international trade? **(10)**

6. a) Discuss the importance of the reforms introduced in the New Economic Policy (NEP), 1991. **(20)**

b) What government clearances are needed to start a new business enterprise? **(15)**

c) Write a short note on the Indian Planning System since Independence. **(15)**

7. a) What do you understand by the core competencies of a business? How do they lead to success? **(20)**

b) Explain the BCG Matrix technique of strategic analysis. **(15)**

c) Briefly explain the steps in the SWOT analysis of an organization. **(15)**

8. a) What is Global Marketing? Discuss strategies of Global Marketing. **(20)**

b) Distinguish between Foreign Direct Investment and Foreign Portfolio Investment. **(15)**

c) Discuss the process of country risk analysis. **(15)**

Total No. of Printed Pages-4]

CC(M)

MATHEMATICS

(OPTIONAL)

PAPER - II

[21]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. a) If H is a subgroup of G and N is a normal subgroup of G, then show that $H \cap N$ is a normal subgroup of H. **(10)**

b) Define Cauchy sequence. Apply Cauchy's principle of convergence, prove that the sequence $< a_n >$ defined by $a_n = 1 + \frac{1}{4} + \frac{1}{7} + ... + \frac{1}{3n-2}$ is not convergent. **(10)**

c) If $u(x, y) = x^3 - 3xy^2$, show that there exists a function $v(x,y)$ such that $w=u+iv$ is analytic in a finite region. **(10)**

d) Reduce the following LPP to its standard form:

Maximize $z^* = 3x_1 + 4x_2 + 6x_3$

Subject to the constraints: $2x_1 + x_2 + 2x_3 \geq 6$, $3x_1 + 2x_2 = 8$, $7x_1 - 3x_2 + 5x_3 \geq 9$

$x_1 \geq 0, x_2 \geq 0$ and x_3 unrestricted in sign. **(10)**

e) Find the complete integral of the equation: $2xz - px^2 - 2qxy + pq = 0$ **(10)**

2. a) Prove the following:

i) If H and K are the subgroups of a group. Prove that HK is a subgroup if and only if $HK=KH$. **(10)**

ii) If G is a finite abelian group and p is a prime dividing $|G|$ then G contains an element of order p. **(10)**

b) Evaluate $\int_{(0,3)}^{(2,4)} (2y + x^2)dx + (3x - y)\,dy$ along

i) the parabola $x = 2t$, $y = t^2 + 3$

ii) Straight lines from (0, 3) to (2, 3) and then from (2, 3) to (2, 4)

iii) A straight line from (0, 3) to (2, 4). **(15)**

c) If $f \in R[a,b]$ and $c \in (a, b)$ then prove that:

$$\int_a^b f dx = \int_a^c f dx + \int_c^b f dx \quad \text{if } a < c < b$$ **(15)**

3. a) Prove that a finite integral domain is a field. If p is a prime number, then show that the ring of integers $J_p = \{0,1,2,...., p-1\}$ is a field. **(20)**

b) Test the convergence of the series:

$$\sum_{n=1}^{\infty} \frac{1.3.5...(2n-1)}{2.4.6....2n} \quad \frac{1}{n}$$ **(15)**

c) Evaluate $\frac{1}{2\pi i} \oint_c \frac{e^{zt}}{z^2(z^2 + 2z + 2)} dz$ around the circle C with equation $|z|=3$ **(15)**

4. a) Use and explain the validity of two phase simplex method to maximize.

$$z = 5x_1 + 3x_2$$

Subject to the constraints: $2x_1 + x_2 \le 1,\ x_1 + 4x_2 \ge 6$

$$x_1,\ x_2 \ge 0$$

(20)

b) Using contour integration prove that $\int_0^\infty \frac{\sin x}{x} dx = \frac{\pi}{2}$ **(15)**

c) Show that the sequence $< f_n(x) >,\ x \in [0,1],\ n \ge 2$ defined by :

$$f_n(x) = \begin{cases} n^2 x, & 0 \le x \le 1/n \\ -n^2 x + 2n, & 1/n \le x \le 2/n \\ 0, & 2/n \le x \le 1 \end{cases}$$

Is not uniformly convergent. **(15)**

SECTION - B

5. a) Solve the following LPP by using dual simplex method:

Minimize $z = 3x_1 + x_2$

Subject to constraints

$x_1 + x_2 \ge 1,\ 2x_1 + 3x_2 \ge 2,\ \ x_1, x_2 \ge 0.$ **(10)**

b) In a two dimensional fluid flow, the stream function is $\psi = -\frac{y}{x^2 + y^2}$. Find the velocity potential ϕ. **(10)**

c) Perform five iterations of the bisection method to calculate a root of the equation:

$f(x) = \cos x - xe^x = 0$ **(10)**

d) Solve $r + s - 6t = y \cos x$ **(10)**

e) Find the product of inertia of a semicircular wire about diameter and tangent at its extremity. **(10)**

6. a) Find the Initial Basic Feasible Solution (IBFS) to the following transportation problem using Vogel's Approximation Method (VAM) as per the following cost matrix: **(20)**

	D_1	D_2	D_3	D_4	Supply ↓
S_1	20	25	28	31	200
S_2	32	28	32	41	180
S_3	18	35	24	32	110
Demand →	150	40	180	170	

b) Show that LU decomposition method fails to solve the following system of equations:

$x_1 + x_2 - x_3 = 2,\ \ 2x_1 + 2x_2 + 5x_3 = -3,\ \ 3x_1 + 2x_2 - 3x_3 = 6$

with [1, 0,-1]. Also correct the equations for unique solution. **(15)**

c) Write the canonical form of one dimensional wave equation $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2} = 0$ **(15)**

7. a) Explain D' Alembert's principle in vector form. A uniform rod OA of length $2a$, free to turn about its end O, revolves with uniform angular velocity ω about the vertical OZ through O, and is inclined at a constant angle α to OZ. Show that the value of α is either zero or $\cos^{-1}\left(\frac{3g}{4a\omega^2}\right)$. **(20)**

b) Prove that a boolean algebra is self dual. In a boolean algebra prove that the following results hold:

i) $(a \wedge b)' = a' \vee b'$ ii) $a < b \Leftrightarrow a' \geq b'$ **(15)**

c) Find the approximate value of $I = \int_0^1 \frac{dx}{1+x}$ by using Trapezoidal rule and Simpson's 1/3 rule. Obtain a bound for the errors. **(15)**

8. a) Three parallel rectilinear vortices of the same strength K and in the same sense meet any plane perpendicular to them in an equilateral triangle of side a. Show that all the vortices move round the same cylinder with uniform speed in time $\frac{2\pi a^2}{3K}$. **(20)**

b) Construct a logic table for the following boolean function:

$f(x, y, z) = (x + y + z)\ (xyz)'$ **(15)**

c) Apply Runge-Kutta method (fourth order) to find an approximate value of y where $x = 0.2$, given that $\frac{dy}{dx} = x + y^2$ and $y = 1$ when $x = 0$. **(15)**

Total No. of Printed Pages-4]

CC(M)

MEDICAL SCIENCE

(OPTIONAL)

PAPER - II

[23]

Time Allowed - Three Hours | *Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. a) Define severe acute malnutrition (SAM). Discuss the management of complicated SAM in the hospital. Briefly describe the essential components of post-discharge home-based care. **(5+10+5=20)**

b) What are the benefits of breast feeding? Briefly discuss common problems encountered during breastfeeding. **(10+5=15)**

c) Describe the etiology of rickets. Discuss its clinical features and outline the principles of management. **(5+5+5=15)**

2. a) Write short notes on: **(4 × 5 = 20)**

i) Damage Control Surgery

ii) Varicose Vein

iii) Internal hemorrhoids

iv) Achalasia Cardia

b) Write short notes on: **(4×5=20)**

i) Network analysis.

ii) Advantages and limitations of cross-sectional studies in health policy.

iii) Intersectoral coordination in the control of SAM.

iv) Current status of perinatal mortality in India and the initiatives to reduce perinatal mortality in India.

c) Describe the strategies for Vector Borne Disease Control in India. **(10)**

3. a) A 35-year-old male presents with chronic cough, low-grade fever, and weight loss for the last 2 months. Discuss the approach to evaluation and management. **(10+10=20)**

b) I) Describe the clinical presentation of scabies in a 7-month-old infant under the following headings:

i) Morphology

ii) Distribution, and

iii) Two complications

II) Prescribe treatment for an adult with scabies. **(10+10=20)**

c) Discuss in brief: **(5+5=10)**

i) ECG changes in myocardial ischemia.

ii) Post-exposure prophylaxis for HIV.

4. a) Discuss the management of the following: **(5+5+5+5=20)**

i) Pleural effusion

ii) Acid peptic disease

iii) Hypothyroidism

iv) Dog bite with high-risk exposure

b) Define and enumerate the causes of Upper gastrointestinal bleeding. Describe the etiopathogenesis, clinical features, and management of acute upper GI bleeding in a 58-year old patient with a history of prolonged intake of NSAIDs. **(5+15=20)**

c) Discuss in brief: **(5+5=10)**

i) Newer initiatives under the National TB Elimination Programme (NTEP).

ii) Critical appraisal of the staffing pattern in First Referral Unit.

SECTION - B

5. a) Discuss the haematological changes occurring during pregnancy. What are the various classifications and causes of anemia during pregnancy? How will you manage a pregnant woman who is detected to have a haemoglobin level of 7 g/dL at 32 weeks of pregnancy? **(5+5+10=20)**

b) Enumerate the differential diagnosis of acute abdominal pain in the right lower quadrant. Describe the etiopathogenesis, presentation, and management of suspected acute appendicitis in a 16-year-old female. **(5+10=15)**

c) Discuss the diagnostic approach, clinical features, and management of a case of pulmonary thromboembolism. **(5+5+5=15)**

6. a) What is universal immunization? Briefly describe the vaccines included in the current states of UIP. Also, explain the umbrella of UIP in NHP. Discuss the vaccine logistics and cold chain management in India. **(5+10+5+10=30)**

b) What is primodial prevention of cardiovascular disease? What are the guidelines for the primary prevention of CVD in India? Discuss the challenges of implementing NPCDCs programme. **(5+5+10=20)**

7. a) Discuss the pathophysiology, complications, and management of pre-eclampsia. How will you manage a case of eclampsia at 34 weeks of gestation? **(5+5+5+5=20)**

b) Write short notes on the following: **(4×5=20)**

i) Microvascular complications of diabetes mellitus

ii) Role of ultrasonography (USG) in chest diseases

iii) Evaluation of pyelonephritis

iv) Management of anxiety disorders

c) A 45-year-old woman presents with a history of fatigue, abdominal pain, and yellowish discolouration of the eyes. She has a history of alcohol use.

i) What are the differential diagnoses?

ii) How will you evaluate her condition?

iii) Discuss the management of alcoholic cirrhosis. **(2+2+6=10)**

8. a) i) Tabulate 5 common allergens causing allergic contact dermatitis, along with the sites at which they cause the inflammation.

ii) Enumerate the steps of performing a patch test to find the cause of allergic contact dermatitis by making a schematic diagram. **(10+10=20)**

b) Write short notes on: **(4×5=20)**

i) MTP Act

ii) Puerperal Sepsis

iii) Immunization during Pregnancy

iv) Non-invasive prenatal testing

c) Describe the steps to be taken for investigating Food poisoning in a hostel. Briefly describe the control measures in government hostels. **(5+5=10)**

Total No. of Printed Pages-3]

CC(M)

PHILOSOPHY

(OPTIONAL)

PAPER - II

[24]

Time Allowed - Three Hours	*Maximum Marks-250*

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SECTION - A

1. a) What roles does Kautilya assign to *Swami* and *Daṇḍa* in his Saptaṇga theory of state? Discuss. **(10)**

b) "Anarchy is based on the assumption that each individual is a sovereign unto oneself." Comment . **(10)**

c) Present Mill's account of no-harm principle of liberty and the role of government in that context. **(10)**

d) Present an exposition of arguments in favour of Capital Punishment from the perspective of retributive and deterrent theory of punishment. **(10)**

e) Analyse the issue of Corruption as a problem related to accountability . **(10)**

2. a) "When we assert our right to live,we place obligation upon everyone not to kill." Comment on the juxtaposition between the notions of rights and duties in the light of the above statement. **(20)**

b) How do the ideas of historical materialism and dialectical materialism play out in the Marxist ideology? Critically discuss. **(15)**

c) "Humanism affirms that human beings have the right and responsibility to give meaning and shape to their own lives." Critically discuss the philosophical notion of Humanism in the light of above statement . **(15)**

3. a) How do Hobbes and Locke differ in their conceptualization of natural rights?Critically discuss. **(20)**

b) "The issue of unequal power relations between men and women are at the heart of the problem of Gender discrimination." Critically discuss . **(15)**

c) How do the questions of equity, justice , and the impact of development on vulnerable groups play out in the ethics of development? Critically discuss . **(15)**

4. a) What are the main points of difference between Ambedkar's and Gandhi's approaches to remedy the evil of Caste discrimination? Discuss. **(20)**

b) How does the idea of Multiculturalism address the questions related to "identity politics," "the politics of difference ," and "the politics of recognition,"? Critically discuss . **(15)**

c) Is democracy inherently a just political system or it is name given to such kind of democratic processes that are designed to achieve just outcomes? Critically discuss. **(15)**

SECTION - B

5. a) How is the idea of God conceptualized in Yoga philosophy? Critically discuss . **(10)**

b) Present the main points of critique of Nyāya view of God offered by Mīmāṁsā and Buddhist schools of thought. **(10)**

c) What arguments do critics of the design argument for the existence of God offer to argue that the analogy between the natural world and a watch or other man-made objects is flawed? Discuss . **(10)**

d) How does Kant's view that existence doesn't add to the essence of a being, play out with reference to the a priori proofs for the existence of God? Discuss. **(10)**

e) How does the omniscience attributed to God problematize some of the fundamental assumptions in the study of ethics? Discuss . **(10)**

6. a) How does the conceptualization of God as benevolent being get problematized by the presence of Evil in the world? What are the possible philosophical solutions to resolve this problem? Critically discuss. **(20)**

b) Can Wittgenstein's view of 'language game' and ' form of life' provide us a methodology to theorize religious language? Critically discuss. **(15)**

c) What are the objections from the materialists and the positivists with reference to the idea of immortality of soul and rebirth? Critically discuss along with their possible answers . **(15)**

7. a) Is it possible to have a foundational moral framework that supports religious diversity without promoting moral relativism? Critically discuss. **(20)**

b) Can one attribute any purposiveness to human life in the absence of a divine plan? Critically discuss. **(15)**

c) Is the theory of Divine Command in ethics antithetical to moral realism? Discuss.**(15)**

8. a) How do the ideas of theism and deism bear upon the relation between the human beings and the world? Discuss. **(20)**

b) Are claims of religious experience tantamount to cognitive claims? Critically discuss. **(15)**

c) How does Leibniz conceptualize the relation between an individual and the God in his philosophy? Critically discuss . **(15)**

Total No. of Printed Pages-4]

CC(M)

PHYSICS

(OPTIONAL)

PAPER - II

[25]

Time Allowed - Three Hours	*Maximum Marks-250*

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vii) *Non Programmable Calculators are allowed.*

SECTION - A

(5×10=50)

1. a) Is it possible to liberate an electron from a metal surface having work function 5 eV with an incident radiation of wavelength (i) 5000 A^0 and (ii) 2000 A^0. **(10)**

b) Using uncertainty Principle, show that the electron cannot exist inside the nucleus. **(10)**

c) Compare de Broglie wavelengths of an electron and a proton having same kinetic energies. **(10)**

d) Prove quantum mechanically that a particle will not exist in a box if its energy is zero. Discuss zero point energy. **(10)**

e) Assuming that each atom of Copper contributes one free electron, calculate the drift velocity of free electrons in the copper conductor of cross-sectional area 10^{-4} m^2 carrying a current of 200 A, given atomic weight of Cu = 63.5, density of Cu = 8.94×10^3 Kg m^{-3}. **(10)**

2. a) Discuss the failure of classical electromagnetic theory to explain the Photoelectric Effect. How did Einstein's photoelectric equation explain the basic facts of Photoelectric emission using quantum theory of radiation. **(20)**

b) i) State time energy uncertainty relation and hence, obtain it from position momentum uncertainty principle.

ii) Verify that uncertainty principle can be expressed in the form $\Delta L \Delta\theta \geq h/4\pi$, where L is the angular momentum and θ is the angular position. **(15)**

c) Calculate the wavelength of the incident X-ray photon which produces recoil electron of energy 4 KeV in Compton effect. The electron recoils in the direction of incident photon and photon is scattered at an angle 180°. **(15)**

3. a) Solve the Schrodinger's wave equation for a particle in a square well potential defined by

$V(x) = V_0$ *for* $-\infty < x < 0$

$V(x) = 0$ *for* $0 \leq x \leq a$

$V(x) = V_0$ *for* $a < x < \infty$

Where total energy of the particle $E > V_0$. Calculate the value of Transmission coefficient. **(25)**

b) Show how XOR and XNOR gates can be obtained from the Universal NAND Gate. Give their truth tables and logic symbols. **(15)**

c) Use Boolean algebra to simply the following expression:
(A+B)(A+C)(A+D)
Draw the logic circuit and the truth table of the final expression. **(10)**

4. a) Discuss the salient features of Meson Theory of nuclear forces. **(20)**

b) Discuss the ground state properties of deuteron. Explain in detail the magnetic dipole moment and electric quadrupole moment of deuteron. **(15)**

c) State and explain with examples the conservation laws which govern the elementary particles and their decay. **(15)**

SECTION-B

(5×10=50)

5. a) A light beam of wavelength 4000 A^0 falls on a metallic surface used in an experiment to study photoelectric effect. If the stopping potential is 1.5 V, calculate the work function of the surface and the maximum wavelength of light that can cause photoelectric emission. **(10)**

b) Calculate Lande's g factor and total magnetic moment for (i) $^2D_{3/2}$ and (ii) $^2P_{3/2}$ states. **(10)**

c) Given $\psi(x) = \sqrt{\alpha x}\, e^{(-\alpha x)}$; find the probability of existence of the particle between $x = 1/\alpha$ and $x = 2/\alpha$. **(10)**

d) Discuss the three laws of conservation that are violated in β - decay. **(10)**

e) The current gain α of n-p-n transistor is 0.98. It is connected in common base mode and gives a reverse saturation current, $I_{CO} = 12\ \mu A$. Find the base and collector current for an emitter current of 2mA. **(10)**

6. a) Calculate average value of position and p^2 for the wave function: **(20)**

$$\psi(x) = \sqrt{\frac{2}{l}}\ \sin\left(\frac{\pi x}{l}\right) \qquad 0 < x < l$$

b) Give the theory of and obtain an expression for energies of various vibrational levels for a Diatomic molecule. Show that the energy levels are equally spaced. **(20)**

c) Show that the number of terms for pd configuration is the same for LS and JJ Coupling. **(10)**

7. a) Obtain an expression for energy levels of the harmonic oscillator by applying Schrodinger equation and Hence, plot the energy levels of the oscillator. **(25)**

b) Discuss the assumptions made by Debye about atomic vibrations in solids. Hence, derive the general expression for specific heat of solids and show that the Debye model leads to T^3 law for temperature less than Debye temperature. **(25)**

8. a) Show that in rotational spectra the energy levels are not equally spaced whereas the frequencies are equally spaced. **(20)**

b) (i) Calculate the velocity of an electron in n^{th} Bohr orbit of hydrogen atom. Hence, find the Velocity in the first orbit. **(10)**

(ii) Calculate the ratio of the wavelength of de-Broglie waves in the third and fourth Bohr Orbit in the hydrogen atom. **(10)**

c) The molecular weight of rock salt (a simple cubic crystal) is 58.5 kg per kilomole and its density is $2.16 \times 10^3\ kg/m^3$. Calculate the grating space d_{100} of rock salt. Using this value of lattice constant, calculate the wavelength of X-rays in second order, if angle of diffraction, θ is 26^0. **(10)**

Useful Data

Velocity of light in vacuum c	=	$3 \times 10^{8}\ m/s$
Mass of electron m_e	=	$9.11 \times 10^{-31}\ kg$
Charge of electron e	=	$1.602 \times 10^{-19}\ C$
Specific charge of electron e/m_e	=	$1.76 \times 10^{11}\ C/kg$
$1\ u = 1\ amu = 1.66056 \times 10^{-27}\ kg$	=	$931.5\ MeV/c^2$
Rest mass energy of electron $m_e c^2$	=	$0.511\ MeV$
Permittivity in free space ϵ_0	=	$8.8542 \times 10^{-12}\ C^2/N/m^2$
Permeability in free space μ_0	=	$4\pi \times 10^{-7}\ N/A^2$
Gas constant R	=	$8.314\ J/mol/K$
Boltzman constant k_B	=	$1.381 \times 10^{-23}\ Kg$
Planck constant h	=	$6.626 \times 10^{-34}\ Js$
Bohr magneton μ_B	=	$9.274 \times 10^{-24}\ J/T$
Nuclear magneton μ_N	=	$5.051 \times 10^{-27}\ J/T$
Fine structure constant α	=	1/137.03599
Mass of proton M_p	=	$1.0072766\ u = 1.6727 \times 10^{-27} kg$
		$= 938.3\ MeV$
Mass of neutron M_n	=	$1.0086652\ u = 1.6749 \times 10^{-27}\ kg$
		$= 939.6\ MeV$
Mass of deuteron M_d	=	$2.013553\ u$
Mass of α - particle M_α	=	$4.001506\ u$
Mass of $^{12}_{6}C$	=	$12.0000000\ u$
Stefan - Boltzmann constant σ	=	$5.7 \times 10^{-8}\ Watt/m^2/K^4$
Mass of sun M_S	=	$1.99 \times 10^{30}\ kg$
Radius of sun R_s	=	$6.96 \times 10^{8}\ m$
Gravitational constant G	=	$6.673 \times 10^{-11}\ Nm^2/kg^2$
Avogadro Number	=	$6.022 \times 10^{23}\ mol^{-1}$

Total No. of Printed Pages-3]

CC(M)
POLITICAL SCIENCE AND INTERNATIONAL RELATIONS
(OPTIONAL)
PAPER - II
[26]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

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SECTION - A

1. Answer the following in about 150 words each: (5×10=50)

a) Briefly explain the significance of the sociological approach in comparative politics. **(10)**

b) Explain what is 'new' about New Social Movements. **(10)**

c) Write a note on global efforts to achieve nuclear Non-Proliferation in the Post-Cold War era. **(10)**

d) 'In the 21st Century, several factors have contributed to the reversal of globalization'. Give your reflections on the statement. **(10)**

e) Justify India's case for a permanent seat in the United Nations Security Council. **(10)**

2. a) Compare and contrast the Realist and Liberal approaches to the study of International Relations. **(20)**

b) 'Political parties are indispensable to the functioning of democracies.' Discuss. **(15)**

c) Examine how the modern capitalist state reconciles the demands of capital accumulation with the need for social welfare and democratic legitimacy. **(15)**

3. a) Analyse the significance of nuclear deterrence theory in case of conflict between India and Pakistan. **(20)**

b) 'Soft power has been a fundamental element of international diplomatic strategy and a key mechanism for countries to enhance their leverage without coercion or military power.' Examine the statement. **(15)**

c) In what ways the international political order is responding to the increasing role of transnational actors. **(15)**

4. a) Examine the multifaceted and diverse nature of regionalism other than the trade deals and security alliances. **(20)**

b) What are the major challenges before international community in addressing global environmental concerns? **(15)**

c) 'National interest is subjective and an essentially contested concept.' Comment. **(15)**

SECTION - B

5. Answer the following in about 150 words each: **(5×10=50)**

a) Explain the philosophical foundations of India's foreign policy. **(10)**

b) 'Cross-border terrorism has been a major determinant of India's national security doctrine since the 1990s'. Elucidate. **(10)**

c) Discuss India's options for diversifying its energy sources away from West Asia. **(10)**

d) What are the opportunities and challenges faced by the upper riparian countries in using water diplomacy in case of conflicts over the transboundary river systems? **(10)**

e) Write a brief note on the key challenges and shortcomings encountered by the Global South at COP29. **(10)**

6. a) 'Maritime security has emerged as a cornerstone of India's foreign Policy'. Discuss. **(20)**

b) Explore the contribution of the Indian Diaspora in strengthening Indo-African Relations. **(15)**

c) Examine the ideological and structural differences between the World Trade Organization and the New International Economic Order. In what ways these differences impact the global trade governance? **(15)**

7. a) 'Structural inequalities within global institutions impact the Global South's influence on the international order'. Comment. **(20)**

b) 'India - Latin America relations fit into India's broader strategy for diversifying its global partnerships beyond the Indo-Pacific and the West'. Discuss. **(15)**

c) Has India's neutral stance on the Ukraine conflict affected its global diplomatic standing? Elucidate. **(15)**

8. a) Critically evaluate the contributions of India-Japan bilateral relations in advancing strategic, economic, and cultural cooperation within the broader framework of the G20 goals. **(20)**

b) 'India's quest to be a responsible nuclear state has given it considerable diplomatic capital in the world'. Substantiate. **(15)**

c) Critically evaluate the implications of India's continued defence reliance on Russia amid changing global alliances and India's 'Make in India' initiative. **(15)**

Total No. of Printed Pages-3]

CC(M)

PSYCHOLOGY

(OPTIONAL)

PAPER - II

[27]

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SECTION-A

1. Answer the following questions in about 150 words each . (5×10=50)

a) What is meant by item analysis? Briefly describe the steps involved in item analysis.

b) Discuss the Indian approach to psychotherapy.

c) Describe the concept of 'relative deprivation' with the help of an example.

d) Discuss the role of psychology in promoting positive health among defense personnel.

e) Discuss the ways through which social diversity can be used to reduce prejudice in Indian society.

2. a) What are the limitations of psychological tests? What kind of ethical issues may arise while administering psychological tests to the members of a disadvantaged group?**(20)**

b) Describe any one theory of work motivation that is appropriate in the Indian context. **(15)**

c) Discuss the psychological consequences of recent developments in information technology. **(15)**

3. a) "Primary prevention is the core value of community psychology". Critically evaluate this statement to contrast community psychology with clinical psychology. **(20)**

b) Critically discuss the concept of 'achievement motivation', citing some Indian studies. **(15)**

c) Discuss some psychological strategies for handling caste conflicts and caste prejudice in India. **(15)**

4. a) Why do students from disadvantaged communities lag behind their counterparts from advantaged background in academic performance? How can psychologists ameliorate their condition? **(20)**

b) What is the difference between population density and crowding? Discuss the psychological consequences of crowding. **(15)**

c) Discuss some strategies to rehabilitate the victims of social violence. **(15)**

SECTION-B

5. Answer the following questions in about 150 words each. (5×10=50)

a) In what way can psychologists help in personnel selection?

b) Discuss the role of a political leader in bringing about positive social change.

c) Discuss the role of government policies in promoting entrepreneurship among rural women.

d) Discuss the way to control the degradation of the environment due to technology.

e) Describe the characteristics of transformational leadership.

6. a) Describe symptoms of schizophrenia that are used for differential diagnosis. Discuss psychological strategies to manage persons suffering from schizophrenia. **(20)**

b) Why is Spearman-Brown correction used in the case of split-half reliability. **(15)**

c) Discuss some strategies to prevent drug abuse among youths. **(15)**

7. a) Discuss a social-psychological theory to explain intergroup conflict. What role can social psychologists play in promoting social integration? **(20)**

b) Discuss psychological and social factors responsible for preventing women from reaching the top level in an organization. **(15)**

c) Discuss some strategies for rehabilitating old people in the metropolitan cities in India. **(15)**

8. a) Critically comment on the suitability of Psychodynamic and Client-centred therapies in the context of non-Western societies. **(20)**

b) Discuss the psychological impacts of social media on adolescents. **(15)**

c) Describe the role of psychologists in helping sports persons to handle failure. **(15)**

Total No. of Printed Pages-4]

CC(M)

PUBLIC ADMINISTRATION

(OPTIONAL)

PAPER - II

[28]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION - A

1. Answer the following questions in roughly 150 words each: **(5×10=50)**

a) Briefly analyse the relevance of Kautilya's Arthashastra in modern public administration. How does its principles align with contemporary administrative ethics, statecraft and governance? Examine. **(10)**

b) Discuss the Mughal welfare system of administration in comparison to the concept of 'welfarism' in today's context. **(10)**

c) Examine the changing role of District Collector in managing revenue administration and maintenance of law and order in the district. **(10)**

d) Constitutionalism is the essence of democracy that defines the 'rules based' system of governance. Explain the above statement in the context of the transition from monarchy to parliamentary democracy in India. **(10)**

e) 'The new liberal state has partially ceased to be an active player in the economic domain and has transformed itself into the role of a facilitator and regulator'. With reference to the above statement, critically examine the role of Telecom Regulatory Authority of India (TRAI). **(10)**

2. a) Can Niti Aayog contribute to the Government's agenda of improving governance and implementing innovative measures? In the light of the above statement, highlight the main objectives of the Niti Aayog in contrast to the Planning Commission. **(20)**

b) Human rights are often seen in conflict with national security. How do you see the role of National Human Rights Commission (NHRC) in balancing between universal human rights and national security concerns? Critically examine. **(15)**

c) In the era of globalization, state owned enterprises are facing stiff competition from private sector players. In the light of the above statement, evaluate the objectives and performance of Public Sector Undertakings (PSU). **(15)**

3. a) The key to success in terms of growth and prosperity in developing countries is a fine balance between the public sector and the private sector convergence. Comment.**(20)**

b) Briefly outline the significance of public service delivery in the larger framework of good governance. Do you think decentralization is an effective instrument for improved service delivery outcome? Explain. **(15)**

c) How do disaster management strategies address the recurring phenomena of natural and man-made disasters? Explain with suitable recent examples. **(15)**

4. a) Critically examine the role and significance of the Cabinet Secretariat in the Indian administrative system. How does Cabinet Secretariat coordinate and collaborate with Prime Minister's Office in the decision-making process? Elaborate. **(20)**

b) Capacity Building (CB) and continuous training are the hallmarks of efficient administrators. Evaluate the role of skill enhancement and training institutions in fostering efficiency and competency of civil servants in India. **(15)**

c) Integration of community policing with traditional police structure is an expediency in the contemporary times through building synergy between police and citizens. Comment. **(15)**

SECTION - B

5. Answer the following questions in roughly 150 words each: **(5×10=50)**

a) Despite the 73rd and 74th Constitutional Amendment Acts introduced to empower the local governments, the real power lies with the state government. Do you agree with the statement? Give reasons for your answer. **(10)**

b) 'Corruption still remains a perennial challenge in the governance system'. What according to you could be the effective measures to weed out corruption and bring about more administrative efficiency? Elaborate. **(10)**

c) Critically examine the structural and functional challenges faced by the state administration in India. What reforms would you suggest to enhance its effectiveness, responsiveness and accountability? **(10)**

d) 'Boards and Commissions play a key role in providing useful inputs for policy-making and ensuring effective governance.' With reference to the above statement, explain the structure, functions and role of the Boards and Commissions in India, giving suitable examples. **(10)**

e) The presentation and enactment of the Union Budget in the Parliament outlines the financial planning and economic strategy of the Union Government. Elaborate. **(10)**

6. a) 'The role of Governor in India is increasingly becoming crucial in creating synergy and harmony for better centre-state relations and coordination'. Comment. **(20)**

b) Evaluate the significance of Second Administrative Reforms Commission with examples of its major recommendations. **(15)**

c) Discuss the key challenges of urban governance in India and evaluate the role of municipal bodies in the effective city management. **(15)**

7. a) 'District administration is the bridge between the local and the state administration'. Critically evaluate the functions of the district administration in facilitating civil and revenue administration in the state. **(20)**

b) Examine the role and significance of the Comptroller and Auditor General (CAG) of India in ensuring accountability and transparency in financial administration. **(15)**

c) Briefly explain the concept of 'new localism' in the context of rising clamour for reversing the negative impacts of globalization. **(15)**

8. a) Rural development is crucial to national progress and prosperity. In the light of the above statement, examine few flagship rural development programs and evaluate their challenges and outcome. **(20)**

b) 'The functioning of the Panchayati Raj Institutions (PRIs) is often hampered by the issues of financial dependence on the state governments and failure of political will to ensure real grassroots democracy'. Elaborate. **(15)**

c) 'Granting greater autonomy to the states would be in the best interest for strengthening federalism and promoting the economic development of the country'. Analyse the statement and give your views on the changing dynamics of the centre-state relationship in India. **(15)**

Total No. of Printed Pages-3]

CC(M)

PUNJABI

(OPTIONAL)

PAPER - II

[36]

Time Allowed - Three Hours | ***Maximum Marks-250***

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper

i) *There are **Eight** questions divided in **Two** Sections and printed in Punjabi. Candidate has to attempt **Five** questions in all. Question **No. 1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in Punjabi in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) *Your answer should be precise and coherent.*

iii) *If you encounter any typographical error, please read it as it appears in the text book.*

iv) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*

v) *No continuation sheets shall be provided to any candidate under any circumstances.*

vi) *No blank page should be left in between answers to various questions.*

SECTION - A

ਪ੍ਰਸ਼ਨ:1 (ੳ) ਫ਼ਰੀਦ ਬਾਣੀ ਵਿਚਲੀਆਂ ਵਿਸ਼ਵ-ਵਿਆਪੀ ਸਚਾਈਆਂ ਬਾਰੇ ਨਿਬੰਧ ਲਿਖੋ। **(10)**

(ਅ) ਸਿੱਧ ਕਰੋ ਕਿ 'ਜਪੁਜੀ ਸਾਹਿਬ' ਦਾ ਮੂਲ ਮੰਤਰ ਗੁਰਮਤਿ ਧਾਰਾ ਦਾ ਨਿਚੋੜ ਹੈ। **(10)**

(ਏ) 'ਆਸਾ ਦੀ ਵਾਰ' ਨੂੰ ਵਾਰ ਦੇ ਤੌਰ 'ਤੇ ਪਰਖੋ। **(10)**

(ਸ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਵਿਚ 'ਹੀਰ ਵਾਰਿਸ' ਦਾ ਸਥਾਨ ਨਿਸ਼ਚਿਤ ਕਰੋ। **(10)**

(ਹ) 'ਬੁੱਲ੍ਹੇ ਸ਼ਾਹ ਦੇ ਕਲਾਮ ਵਿਚ ਉਸ ਵੇਲੇ ਦੀਆਂ ਰਾਜਨੀਤਕ ਸਮਾਜਕ ਹਾਲਤਾਂ ਦਾ ਚਿਤਰਣ ਮਿਲਦਾ ਹੈ'। ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਸਪੱਸ਼ਟ ਕਰੋ। **(10)**

ਪ੍ਰਸ਼ਨ:2 (ੳ) ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ ਦੀ ਰਚਨਾ 'ਜਪੁਜੀ' ਸਾਹਿਬ ਵਿਚ ਨਾਮ ਸੁਣਨ ਅਤੇ ਮੰਨਣ ਉਪਰ ਵਿਸ਼ੇਸ਼ ਬਲ ਦਿੱਤਾ ਗਿਆ ਹੈ। ਚਰਚਾ ਕਰੋ। **(20)**

(ਅ) 'ਪ੍ਰੇਮ ਤੇ ਬਿਰਹਾ' ਸ਼ੇਖ਼ ਫ਼ਰੀਦ ਦੇ ਰਹੱਸਵਾਦੀ ਅਨੁਭਵ ਦੇ ਦੋ ਅਹਿਮ ਪਹਿਲੂ ਹਨ। ਇਸ ਧਾਰਨਾ ਦੀ ਪੁਸ਼ਟੀ ਸ਼ੇਖ਼ ਫ਼ਰੀਦ ਦੀ ਬਾਣੀ ਵਿਚੋਂ ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਕਰੋ। **(15)**

(ਏ) ਹੀਰ ਵਾਰਿਸ ਉੱਤੇ ਸੂਫ਼ੀ ਮੱਤ ਦਾ ਪ੍ਰਭਾਵ ਹੈ। ਇਸ ਕਥਨ ਦੇ ਹੱਕ ਅਤੇ ਵਿਰੋਧ ਵਿਚ ਵਿਚਾਰ ਪ੍ਰਗਟ ਕਰੋ। **(15)**

ਪ੍ਰਸ਼ਨ:3 (ੳ) ਬੁੱਲ੍ਹੇ ਸ਼ਾਹ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਉੱਤੇ ਵਿਸਥਾਰ ਨੋਟ ਲਿਖੋ। **(20)**

(ਅ) 'ਹੀਰ' ਦੁਆਰਾ ਵਾਰਿਸ ਆਪਣੇ ਵੇਲੇ ਦੇ ਸਮਾਜ ਦੀ ਤਸਵੀਰ ਉਲੀਕਦਾ ਹੈ। ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਦੱਸੋ। **(15)**

(ਏ) 'ਬਾਰਹਮਾਹ ਤੁਖਾਰੀ' ਵਿਚ ਪੇਸ਼ ਪ੍ਰਕਿਰਤੀ ਚਿਤਰਣ, ਮਾਨਸਿਕ ਚਿਤਰਣ ਤੇ ਅਧਿਆਤਮਕ ਚਿਤਰਣ ਉਪਰ ਨੋਟ ਲਿਖੋ। **(15)**

ਪ੍ਰਸ਼ਨ:4 (ੳ) ਫ਼ਰੀਦ ਬਾਣੀ ਦੇ ਪ੍ਰਤੀਕ ਵਿਧਾਨ 'ਤੇ ਨੋਟ ਲਿਖੋ। **(20)**

(ਅ) ਹੀਰ ਦੇ ਕਿੱਸੇ ਨੂੰ ਵਾਰਿਸ ਸ਼ਾਹ ਨੇ ਆਪਣੀ ਕਾਵਿ ਸ਼ੈਲੀ ਰਾਹੀਂ ਲੋਕ ਪ੍ਰਿਯ ਬਣਾਇਆ ਹੈ। ਵਾਰਿਸ ਦੇ ਕਾਵਿ ਗੁਣਾਂ 'ਤੇ ਚਾਨਣਾ ਪਾਉਂਦੇ ਹੋਏ ਸਿੱਧ ਕਰੋ। **(15)**

(ਏ) ਬੁੱਲ੍ਹੇ ਸ਼ਾਹ ਦੀ ਕਾਵਿ-ਕਲਾ 'ਤੇ ਵਿਸਥਾਰ ਨੋਟ ਲਿਖੋ। **(15)**

SECTION - B

ਪ੍ਰਸ਼ਨ: 5 (ੳ) ਬਲਰਾਜ ਸਾਹਨੀ ਰਚਿਤ 'ਮੇਰਾ ਪਾਕਿਸਤਾਨੀ ਸਫ਼ਰਨਾਮਾ' ਦੀਆਂ ਕਲਾਤਮਕ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਸਬੰਧੀ ਚਰਚਾ ਕਰੋ। **(10)**

(ਅ) ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਿਕ ਦੀ ਪੁਸਤਕ 'ਨਵਾਂ ਜਹਾਨ' ਦੇ ਮੁੱਖ ਬੰਦ ਵਿੱਚ ਦਿੱਤੇ ਵਿਚਾਰਾਂ ਨੂੰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਲਿਖੋ। **(10)**

(ਇ) ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ ਦੀ ਪੁਸਤਕ 'ਪੰਜਾਬੀ ਕਾਵਿ ਸ਼੍ਰੋਮਣੀ 'ਵਿੱਚ ਸ਼ਾਮਿਲ ਨਿਬੰਧ 'ਨਾਨਕ ਦੇ ਜਪੁ ਦਾ ਬੌਧਿਕ ਰਹੱਸ' ਉੱਤੇ ਨੋਟ ਲਿਖੋ । **(10)**

(ਸ) 'ਇੱਕ ਮਿਆਨ ਦੋ ਤਲਵਾਰਾਂ' ਨਾਵਲ ਵਿਚਲੇ ਇਤਿਹਾਸਕ ਤੱਥਾਂ ਉਤੇ ਚਾਨਣਾ ਪਾਓ। **(10)**

(ਹ) ਗੁਰਬਖਸ਼ ਸਿੰਘ ਦੀ ਪੁਸਤਕ 'ਜ਼ਿੰਦਗੀ ਦੀ ਰਾਸ' ਵਿੱਚ ਸ਼ਾਮਿਲ ਨਿਬੰਧ 'ਅਗਾਂਹ ਵਧੂ ਸਾਹਿਤ' ਵਿਚਲੇ ਵਿਚਾਰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਪੇਸ਼ ਕਰੋ। **(10)**

ਪ੍ਰਸ਼ਨ: 6 (ੳ) ਸ਼ਾਹ ਮੁਹੰਮਦ ਦੀ ਰਚਨਾ 'ਜੰਗ ਸਿੰਘਾਂ ਤੇ ਫਰੰਗੀਆਂ' ਦੀਆਂ ਕਾਵਿ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ 'ਤੇ ਚਾਨਣਾ ਪਾਓ । **(20)**

(ਅ) ਬਲਰਾਜ ਸਾਹਨੀ ਦੇ ਸਫ਼ਰਨਾਮੇ 'ਮੇਰਾ ਰੂਸੀ ਸਫ਼ਰਨਾਮਾ' ਵਿੱਚ ਰੂਸੀ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਦੀ ਕਿਸ ਕਿਸਮ ਦੀ ਤਸਵੀਰ ਪੇਸ਼ ਹੋਈ ਹੈ? ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਲਿਖੋ । **(15)**

(ਇ) ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਿਕ ਦੀ ਪੁਸਤਕ 'ਸੂਫ਼ੀਖਾਨਾ' ਵਿਚ ਮਨੁੱਖੀ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਨੂੰ ਸਤਿ ਅਤੇ ਸੁੰਦਰ ਬਣਾਉਣ ਦੇ ਵਿਚਾਰ ਪੇਸ਼ ਕੀਤੇ ਹਨ। ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਦੱਸੋ । **(15)**

ਪ੍ਰਸ਼ਨ: 7 (ੳ) 'ਮੇਰੀਆਂ ਅਭੁੱਲ ਯਾਦਾਂ' ਪੁਸਤਕ ਵਿੱਚ ਸ਼ਾਮਿਲ 'ਮੇਰਾ ਨਿਸਫ਼ਲ ਪਿਆਰ' ਦਾ ਸਾਰ ਆਪਣੇ ਸ਼ਬਦਾਂ ਵਿੱਚ ਲਿਖੋ। **(20)**

(ਅ) ਨਾਨਕ ਸਿੰਘ ਦੇ ਨਾਵਲ 'ਚਿੱਟਾ ਲਹੂ' ਵਿਚਲੇ ਦੁਖਾਂਤ ਬੋਧ ਉੱਪਰ ਵਿਚਾਰ ਕਰੋ । **(15)**

(ਇ) ਬਲਵੰਤ ਗਾਰਗੀ ਦੇ ਨਾਟਕ 'ਸੁਲਤਾਨ ਰਜ਼ੀਆ' ਦੀਆਂ ਵਿਭਿੰਨ ਪਰਤਾਂ ਉਤੇ ਚਾਨਣਾ ਪਾਓ । **(15)**

ਪ੍ਰਸ਼ਨ: 8 (ੳ) ਪ੍ਰਿੰ. ਸੰਤ ਸਿੰਘ ਸੇਖੋ ਦੁਆਰਾ ਲਿਖੀ ਪੁਸਤਕ 'ਸਾਹਿਤਿਆਰਥ' ਨਾਲ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ ਕਰਵਾਓ। **(20)**

(ਅ) 'ਬਲਵੰਤ ਗਾਰਗੀ ਨੇ ਆਪਣੇ ਨਾਟਕ 'ਧੁਣੀ ਦੀ ਅੱਗ'ਵਿੱਚ ਔਰਤ ਅਤੇ ਮਰਦ ਦੇ ਰਿਸ਼ਤੇ ਵਿੱਚ ਉਪਜੀ ਮਾਨਸਿਕ ਸੰਕੀਰਨਤਾ ਨੂੰ ਪ੍ਰਗਟਾਇਆ ਹੈ'। ਚਰਚਾ ਕਰੋ। **(15)**

(ਇ) 'ਪਵਿੱਤਰ ਪਾਪੀ' ਨਾਵਲ ਦੇ ਮੁੱਖ ਪਾਤਰ ਕੇਦਾਰ ਦੀ ਭਾਵ ਅਤੇ ਸੰਸਕਾਰ ਦੇ ਤਨਾਓ ਦੀ ਸਥਿਤੀ ਉੱਤੇ ਨੋਟ ਲਿਖੋ । **(15)**

Total No. of Printed Pages-3]

CC(M)

SOCIOLOGY

(OPTIONAL)

PAPER - II

[29]

Time Allowed - Three Hours | ***Maximum Marks-250***

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

*i) There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in all. Question **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) Your answer should be precise and coherent.

iii) If you encounter any typographical error, please read it as it appears in the text book.

iv) Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.

v) No continuation sheets shall be provided to any candidate under any circumstances.

vi) No blank page should be left in between answers to various questions.

SECTION - A

1. Answer the following questions in about 150 words each:

a) What is sanskritization? **(10)**

b) What is dialectical approach? **(10)**

c) What is little tradition? **(10)**

d) Describe the characteristics of "Middle Class" in India. **(10)**

e) Discuss the concept of "detribalization". **(10)**

2. a) What is industrialism? Discuss the factors responsible for industrialisation in India? **(20)**

b) Critically discuss the social background of Indian nationalism. **(15)**

c) Critically analyse how pluralism impacts the idea of citizenship in Indian state. **(15)**

3. a) What is ethnic conflict? Discuss with suitable examples. **(20)**

b) Discuss the relation between caste and politics in India. **(15)**

c) Discuss the "rural-urban continuum" with suitable examples. **(15)**

4. a) Critically analyse the existing role of "village panchayat" and "caste council" in India with examples. **(20)**

b) What are Caste based movements? Discuss factors responsible for the emergence of caste based movements. **(15)**

c) What is political mobilization? Discuss it's ramification in Indian democracy. **(15)**

SECTION - B

5. Answer the following questions in about 150 words each:

a) What is *Mitakshara*? How it is different from *Dayabhaga* ? **(10)**

b) Discuss the Indological approach for studying the structure of Indian society. **(10)**

c) What is *hyperagamy* and *hypogamy* ? **(10)**

d) What is "jajmani system"? Describe its key features. **(10)**

e) 'Migration significantly impacts the functioning of planned economy'. Discuss it with examples. **(10)**

6. a) Critically analyse the question of dowry through ages? **(20)**

b) Discuss the issues related to integration of tribals in the context of Indian State. **(15)**

c) What are the factors responsible for increasing cases of divorce in our society? **(15)**

7. a) Discuss the main argument of Louis Dumont's *"Homo Hierarchicus"* ? **(20)**

b) Discuss the work of any Indian sociologist, who studied society through structural- functional approach. **(15)**

c) How did Raja Ram Mohan Roy blends tradition and modernity in his reformist ideology? **(15)**

8. a) Critically analyse the rise of backward class movements in contemporary times. **(20)**

b) What is decentralization of power? Critically discuss with suitable examples. **(15)**

c) What is Open and Distance Learning systems? Critically discuss. **(15)**

Total No. of Printed Pages-4

CC(M)
URDU
(OPTIONAL)
(LITERATURE)
PAPER - II
[37]

[Maximum Marks - 250]

[Time Allowed - Three Hours]

سوالات سے متعلق خاص ہدایات

(سوالوں کے جواب تحریر کرنے سے پہلے درج ذیل ہدایات کو غور سے پڑھئے)

۱۔ اس پرچے میں آٹھ سوالات ہیں جو دو حصوں (سیکشن) پر مشتمل ہیں۔

۲۔ امیدوار کو کل پانچ سوالوں کے جواب دینے ہیں۔

۳۔ صرف پانچ سوالوں کے جواب لکھئے۔ سوال نمبر **1** اور **5** کے جواب لازمی ہیں۔ دونوں سیکشن کے باقی سوالات میں سے صرف تین سوالوں کے جواب دینے ہیں لیکن ہر سیکشن کے سوالات میں سے کم از کم ایک سوال کا انتخاب ضروری ہے۔

۴۔ ہر سوال یا سوال کے حصے کے نمبر اس کے سامنے درج کر دیئے گئے ہیں۔

۵۔ جوابات اُردو میں ہی مطلوب ہیں۔

۶۔ سوالات کے جوابات کے لیے الفاظ کی جو تعداد مقرر کی گئی ہے اس کی پابندی لازمی ہے۔

۷۔ سوالات کے جوابات کو ترتیب وار اہمیت دی جائے گی۔ جب تک کوئی جواب یا اس کا حصہ کاٹ کر مسترد نہ کر دیا گیا ہو سوال کا جواب تصور کیا جائے گا اگرچہ جواب جزوی طور پر ہی حل کرنے کی کوشش کی گئی ہو۔ کوئی صفحہ یا صفحے کا کوئی حصہ اگر چھوڑا جائے تو اس کو کاٹنا ضروری ہے۔

SECTION - A

1. درج ذیل سوالوں کے جوابات دی گئی ہدایات کے مطابق تحریر کیجئے۔ (20+15+15=50)

(الف) مندرجہ ذیل اقتباس کی تشریح سیاق وسباق کے حوالے سے کیجئے۔(200 الفاظ میں) (20)

میں نے ہوش سنبھالتے ہی ایسے بزرگوں کو اپنے سامنے پایا جو عقائد وافکار میں اپنا ایک خاص مسلک رکھتے تھے اور اس میں اس درجہ سخت اور بے لچک تھے کہ بال برابر بھی ادھر اُدھر ہونا کفر وزندقہ تصور کرتے تھے میں نے بچپن سے اپنے خاندان کی جو روایتیں سنیں، وہ بھی سرتاسر اسی رنگ میں ڈوبی ہوئی تھیں اور میرا دماغی ورثہ اس تصلّب اور جمود سے بوجھل تھا۔ میری تعلیم ایسے گردوپیش میں ہوئی جو چاروں طرف سے قدامت پرستی اور تقلید کی چاردیواری میں گھرا ہوا تھا اور باہر کی مخالف ہواؤں کا وہاں تک گزر ہی نہ تھا۔ والد مرحوم کے علاوہ جن اساتذہ سے تحصیل کا اتفاق ہوا وہ بھی وہی تھے جنہیں والد مرحوم نے پہلے اچھی طرح ٹھونک بجا کے دیکھ لیا تھا، کہ اُن کے معیارِ عقائد وفکر پر پورے پورے اتر سکتے ہیں اور یہ معیار اس درجہ تنگ اور سخت تھا کہ ان کے معاصروں میں سے خال خال اشخاص ہی کی وہاں تک رسائی ہوسکتی تھی۔ پس ظاہر ہے کہ اِس دروازہ سے بھی کسی نئی ہوا کے گزرنے کا امکان نہ تھا جہاں تک زمانے کے فکری اِنقلاب کا تعلق ہے، میرے خاندان کی دنیا وقت کی راہوں سے اس درجہ دور واقع ہوئی تھی کہ اُن راہوں کی کوئی صدا وہاں تک پہنچ ہی نہیں سکتی تھی اور اس اعتبار سے گویا سو برس پہلے کے ہندوستان میں میں زندگی بسر کررہا تھا۔ ابتدائی صحبتوں کو انسانی دماغ کا سانچہ ڈھالنے میں بہت دخل ہوتا ہے لیکن میری سوسائٹی اوائلِ عمر میں گھر کی چاردیواری کے اندر محدود رہی اور گھر کے عزیزوں اور بزرگوں کے علاوہ اگر کوئی دوسرا گروہ ملا بھی تو وہ خاندان کے معتقدوں اور مریدوں کا گروہ تھا، وہ میرے ہاتھ پاؤں چومتے اور ہاتھ باندھے کھڑے رہتے؛ یا رجعتِ قہقری کرکے پیچھے ہٹتے اور دور مؤدب ہوکر بیٹھ جاتے۔ یہ فضا صورت حال میں تبدیلی پیدا کرنے کی جگہ اور زیادہ سے زیادہ اسے گہری کرتی رہتی۔ والد مرحوم کے مریدوں میں ایک بڑی تعداد علماء اور انگریزی تعلیم یافتہ اشخاص کی تھی۔ دیوان خانہ میں اکثر ان کا مجمع رہتا، مگر یہ پورا مجمع بھی سرتاسر اسی خاندانی رنگ میں رنگا ہوا تھا؛ کسی دوسرے رنگ کی وہاں جھلک بھی دکھائی نہیں دیتی تھی۔

(ب) اردو نثر کے ارتقا میں غالبؔ کے خطوط کی اہمیت (15)

(ج) ''گئودان'' کے فکری وفنی محاسن (15)

2. درج ذیل پر تنقیدی نوٹ لکھئے۔ (20+15+15=50)

(الف) ''باغ و بہار'' کی زبان واسلوب (200 الفاظ میں) (20)

(ب) غبارِ خاطر' کی ادبی اہمیت (150 الفاظ میں) (15)

(ج) بیدی کا فن ''اپنے دکھ مجھے دے دو'' کی روشنی میں (150 الفاظ میں) (15)

3. درج ذیل پر تنقیدی مضمون لکھئے۔ (20+15+15=50)

(الف) مکتوباتِ غالب کی عصری معنویت (200 الفاظ میں) (20)

(ب) محمد حسین آزاد کی انشائیہ نگاری (نیرنگِ خیال کی روشنی میں) (150 الفاظ میں) (15)

(ج) ابوالکلام آزاد کے اسلوب نگارش کے امتیازات (غبارِ خاطر کی روشنی میں) (150 الفاظ میں) (15)

4. درج ذیل پر تنقیدی مضمون لکھئے۔ (20+15+15=50)

(الف) داستان نگاری کی تاریخ میں ''باغ و بہار'' کی اہمیت (200 الفاظ میں) (20)

(ب) پریم چند کی ناول نگاری اور ''گئودان'' (150 الفاظ میں) (15)

(ج) بطور رانشائیہ نگار محمد حسین آزاد کی انفرادیت (150 الفاظ میں) (15)

SECTION - B

درجِ ذیل سوالوں کے جوابات دی گئی ہدایات کے مطابق تحریر کیجئے۔

5. درجِ ذیل اشعار کی تشریح مع سیاق وسباق کیجئے۔ (5×10=50)

(الف) کہا میں نے کتنا ہے گل کا ثبات (100 الفاظ میں) (10)
کلی نے یہ سُن کر تبسم کیا

(ب) وفاداری بہ شرطِ استواری اصل ایماں ہے (100 الفاظ میں) (10)
مرے بت خانے میں تو کعبے میں گاڑو برہمن کو

(ج) اپنے من میں ڈوب کر پا جا سراغِ زندگی (100 الفاظ میں) (10)
تو اگر میرا نہ بنتا ہے نہ بن اپنا تو بن

(د) اس دور میں زندگی بشر کی (100 الفاظ میں) **(10)**
بیمار کی رات ہوگئی ہے

(ہ) ہے اہلِ دل کے لیے اب یہ نظمِ بست وکشاد (100 الفاظ میں) **(10)**
کہ سنگ وخشت مقیّد ہیں اور سگ آزاد

6. درج ذیل پر تنقیدی مضمون لکھئے۔ **(20+15+15=50)**

(الف) اختر الایمان کی نظم نگاری کے امتیازی پہلو (بنتِ لمحات کی روشنی میں) (200 الفاظ میں) **(20)**

(ب) ''سحر البیان'' کی فنی خصوصیات (150 الفاظ میں) **(15)**

(ج) اقبال بحیثیت نظم نگار (150 الفاظ میں) **(15)**

7. مندرجہ ذیل پر تنقیدی تبصرہ کیجئے۔ **(20+15+15=50)**

(الف) اردو مثنوی نگاری کی تاریخ میں ''سحر البیان'' کی اہمیت (200 الفاظ میں) **(20)**

(ب) فراقؔ کی شاعری کے امتیازی پہلو (گل نغمہ کی روشنی میں) (150 الفاظ میں) **(15)**

(ج) غالبؔ کی غزل گوئی (150 الفاظ میں) **(15)**

8. مندرجہ ذیل پر تنقیدی نوٹ لکھئے۔ **(20+15+15=50)**

(الف) فیض احمد فیض کی شاعری کے امتیازی پہلو ('دستِ صبا' کی روشنی میں) (200 الفاظ میں) **(20)**

(ب) فراقؔ کی نظم نگاری (150 الفاظ میں) **(15)**

(ج) اختر الایمان بحیثیت ایک جدید شاعر (بنتِ لمحات کی روشنی میں) (150 الفاظ میں) **(15)**

Total No. of Printed Pages-3]

CC(M)

ZOOLOGY

(OPTIONAL)

PAPER - II

[31]

Time Allowed - Three Hours	*Maximum Marks-250*

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

i) *There are **Eight** questions divided in **Two** Sections and printed in English. Candidate has to attempt **Five** questions in all. Questions **No.1** and **5** are compulsory and out of the remaining, any **Three** are to be attempted choosing at least **One** question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*

ii) *Your answer should be precise and coherent.*

iii) *If you encounter any typographical error, please read it as it appears in the text book.*

iv) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*

v) *No continuation sheets shall be provided to any candidate under any circumstances.*

vi) *No blank page should be left in between answers to various questions.*

SECTION-A

1. Answer the following in about 150 words each:

a) 'Ontogeny recapitulates phylogeny'. Explain. **(10)**

b) Elaborate on the concept of cladistics. **(10)**

c) Discuss the formation and significance of the blastula and the establishment of body axes in early development. **(10)**

d) What is protein folding? Describe the role of hydrophobic interactions and hydrogen bonds in stabilizing protein structure. **(10)**

e) Diagrammatically illustrate the structure of a nephron. **(10)**

2. a) Trace the evolutionary origin of sex chromosomes. How do dosage compensation mechanisms differ in Drosophila and humans? **(20)**

b) Describe the mechanism of olfaction in humans. How are odorant signal molecules transmitted from environment to the brain? **(15)**

c) Evaluate the dual role of cholesterol in maintaining membrane fluidity and serving as a precursor for bioactive molecules. Why is its regulation crucial? **(15)**

3. a) Explain the ABO blood grouping and the Rh blood type systems in humans. Discuss the genetic basis of these blood groups and the importance of blood typing in transfusion medicine. **(20)**

b) Describe the principles and methods used in whole animal cloning. What are the ethical and practical challenges associated with it? **(15)**

c) Explain, using the available fossil data, various evolutionary changes that led to the evolution of *Homo sapiens* from their ancestral stock during various geological era and epochs. **(15)**

4. a) Describe briefly the process of spermatogenesis and oogenesis in mammals. Highlight the differences between the two processes. **(20)**

b) Discuss the role of the hypothalamus in regulating body. **(15)**

c) Explain the concept of free energy in bioenergetics. How do macromolecules contribute to energy flow in biological systems? **(15)**

SECTION-B

5. Answer the following in about 150 words each:

a) What is molecular drive? How does it differ from natural selection and genetic drift in shaping evolutionary patterns? **(10)**

b) How do cell-to-cell interactions guide differentiation? Explain using notochord or neural induction as examples. **(10)**

c) Describe the composition and structure of hemoglobin. Explain how its protein and non-protein components contribute to its function. **(10)**

d) What are multiple alleles? Discuss their genetic significance with the help of appropriate examples. **(10)**

e) Classify enzymes based on the reactions they catalyze. **(10)**

6. a) Compare the molecular events taking place in mitotic and meiotic cell cycles. Add a note on the location and significance of each of these cycles in mammalian body. **(20)**

b) Explain how disrupted signaling pathways lead to pathological cell death, with the help of any one human disease as an example. **(15)**

c) With the help of a suitable diagram, explain the energy yield and key enzymes involved in glycolysis. How does glycolysis differ in aerobic and anaerobic conditions? **(15)**

7. a) Compare mechanisms of mutagenesis by physical and chemical agents. How do cells repair such damage? **(20)**

b) Explain the physiological changes occurring during menopause. How do hormonal changes during menopause affect bone density, cardiovascular health, and reproductive function? **(15)**

c) Discuss different theories of origin of life. How does the RNA world hypothesis address the emergence of early life forms? **(15)**

8. a) Compare the roles of humoral and cell-mediated immunity. How do immunoglobulins coordinate with cellular components during an immune response? **(20)**

b) Describe the metabolic, structural, and functional adaptations and skeletal muscles following endurance and resistance training. **(15)**

c) Explain the differences in gene regulation and expression between prokaryotes and eukaryotes. **(15)**
