ನೋಂದಣಿ ಸಂಖ್ಯೆ : Registration No. :											

V1 – 2026

ವಿಷಯ ಸಂಕೇತ / Subject Code	**40 (NS)**

ವಿದ್ಯುನ್ಮಾನಶಾಸ್ತ್ರ / ELECTRONICS

[ಸಮಯ: 3 ಗಂಟೆಗಳು] [ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 45] [ಗರಿಷ್ಠ ಅಂಕಗಳು : 70]

[Time : 3 Hours] [Total No. of questions : 45] [Max. Marks : 70]

Instructions : 1) *For Part – A questions, only the first written answers will be considered for evaluation.*

2) *Part – D consists of two sections. Section – I is of essay type questions and Section – II is of numerical problems.*

3) *Circuit diagram and truth tables must be drawn wherever necessary.*

4) *Solve the problems with necessary formulae.*

5) *For questions having diagrams, alternate questions are given at the end of the question paper in separate section for visually challenged students.*

PART – A

I. Select the correct answer from the choices given : **(15 × 1 = 15)**

1) Drain characteristics of JFET in Ohmic region is

a) Non-linear b) Linear

c) Exponential d) Constant

2) For the faithful amplification the operating point is chosen at the

a) Center of the active region b) Cut off region

c) Saturation region d) Inversion region

3) Conduction angle for class-B power amplifier is

a) 60° b) 180°

c) 270° d) 360°

4) In a voltage series negative feedback amplifier

a) Input impedance increases b) Bandwidth decreases

c) Voltage gain increases d) Output impedance increases

5) Slew rate is expressed in

a) $\frac{V}{\mu S}$ b) $\frac{\mu S}{V}$

c) $\frac{A}{mS}$ d) $\frac{\Omega}{mS}$

6) The feedback component used in Op-amp integrator circuit is

a) Resistor b) Diode

c) Transistor d) Capacitor

7) The crystal oscillator works on the principle of

a) Piezo magnetic effect b) Piezo static effect

c) Piezo electric effect d) Piezo dynamic effect

8) The medium through which the information flows is known as

a) Source b) Transmitter

c) Channel d) Receiver

9) How many side bands are present in AM?

a) 1 b) 2

c) 3 d) 4

10) A SCR has

a) Two junctions and three layers

b) Three junctions and three layers

c) Three junctions and four layers

d) Four junctions and three layers

11) Logic expression for the output of two input XNOR gate is

a) $Y = AB$ b) $Y = A + B$

c) $Y = \overline{A}$ d) $Y = \overline{A \oplus B}$

12) Group of two adjacent cells in a K-map is called

a) Pair b) Quad

c) Square d) Octet

13) The number of timers present in 8051 microcontroller is

a) One b) Two

c) Three d) Four

14) Size of an integer in C programming is

a) 1 byte b) 2 byte

c) 4 byte d) 8 byte

15) Expansion of CDMA is

a) Code Division Mobile Access

b) Call Division Mobile Access

c) Code Division Multiple Access

d) Call Division Multiple Access

II. Fill in the blanks by choosing appropriate answer from the bracket : **(5 × 1 = 5)**

[a) damped b) universal c) buffer d) timer e) demodulator f) summing]

16) CC amplifier is used as _____.

17) Op-amp inverting adder is also called as _____ amplifier.

18) Tank circuit produces _____ oscillations.

19) Diode detector is called as _____.

20) NAND gate is also known as _____ gate.

PART – B

III. Answer **any five** questions : **(5 × 2 = 10)**

21) Write the expressions for the coordinates of operating point in voltage divider biasing circuit.

22) An amplifier has $Z_0 = 50\,k\Omega$, voltage gain $A = 100$ and $\beta = 0.02$. Determine the output impedance of the feedback amplifier.

23) A RC phase shift oscillator has $R_1 = R_2 = R_3 = R = 5\,k\Omega$ and $C_1 = C_2 = C_3 = C = 0.022\,\mu F$. Calculate frequency of oscillations.

24) Write the expression for AM wave. Write the expression for m_a in terms of V_{max} and V_{min}.

25) List any four power devices.

26) Draw the logic circuit of a full adder using 3-input XOR gate.

27) Mention memory capacity of internal RAM and ROM of 8051 microcontroller.

28) Distinguish between uplink and downlink signals.

PART – C

IV. Answer **any five** questions : **(5 × 3 = 15)**

29) Define drain resistance (r_d), transconductance (g_m) and amplification factor (μ) in JFET.

30) Derive an expression for the voltage gain of a negative feedback amplifier.

31) Sketch the nature of oscillator output waveform for a) $A\beta > 1$ b) $A\beta < 1$ and c) $A\beta = 1$.

32) Define critical angle, critical frequency and skip distance.

33) What are the characteristics of a good receiver?

34) Determine V_{dc} and I_{dc} of SCR FWR. Given firing angle is 0° and rms voltage of ac input to the rectifier is 230 V and load connected is 10Ω.

35) Convert $Y = A + BC$ into canonical SOP form.

36) What is RADAR? Mention any two applications of RADAR.

PART – D (Section I)

V. Answer **any three** questions : **(3 × 5 = 15)**

37) Explain the working of transistor CB amplifier circuit.

38) What is an op-amp non inverting amplifier? Derive an expression for the output voltage of op-amp non-inverting amplifier.

39) Why SR flip-flop is converted into D flip-flop? Explain the working of D flip-flop with logic circuit and truth table.

40) Write ALP for multiplication of two unsigned 8-bit numbers 43H and 2 AH. Store the lower byte in R0 and higher byte in R1.

41) Write a C program to accept radius (in float) and print the area of the circle.

PART – D (Section II)

VI. Answer **any two** questions : **(2 × 5 = 10)**

42) For the CE amplifier circuit shown below :

Calculate

a) V_2

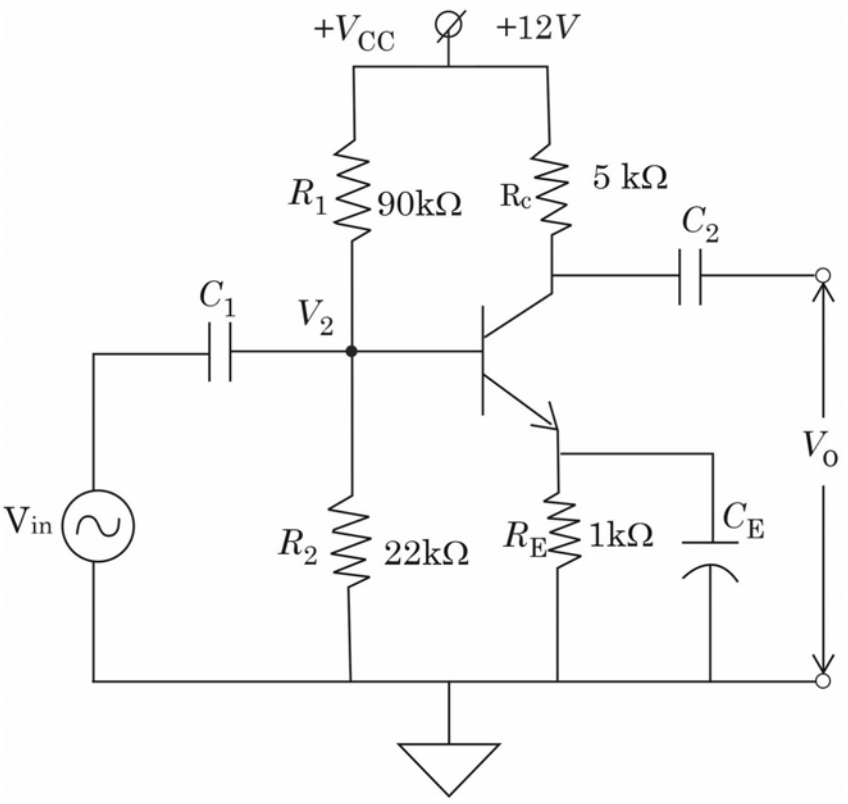
b) I_E

c) r'_e

d) A_V

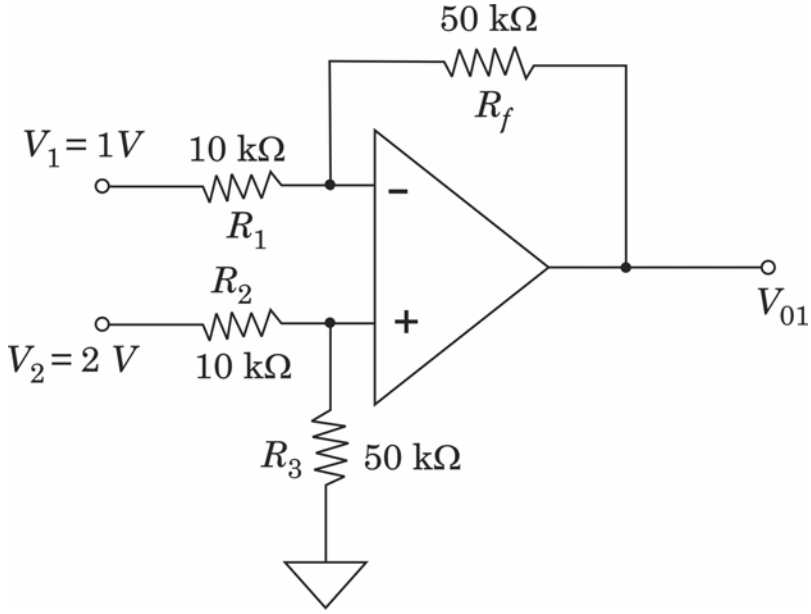
e) $Z_{i\,(base)}$

Given $V_{BE} = 0.7\ V$, $r'_e = \frac{26\ mV}{I_E}$, $\beta = 100$.



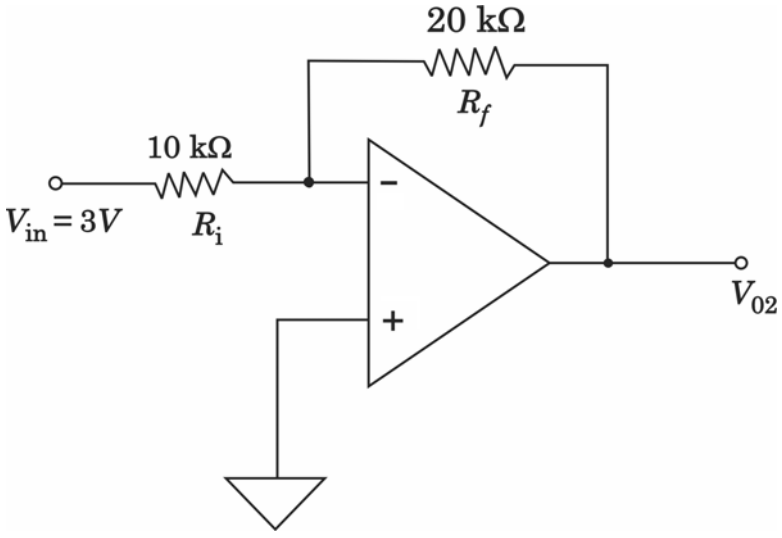
43) Find the output voltage of Op-amp circuits given below :

a)



(3)

b)



(2)

44) The carrier current of AM transmitter is 12 A, it is increased to 13.25 A when a carrier is amplitude modulated. Find the percentage modulation. Determine antenna current I_t when the depth of modulation is 0.5 if carrier current I_c remains at 12 A.

45) Simplify the Boolean expression

$Y(A, B, C, D) = \sum m(2, 6, 7, 9, 12, 13) + \sum d(3, 8)$ using K-map. Draw NAND gate equivalent circuit to realize simplified equation.

PART – E

(For Visually Challenged Students)

42) A single stage CE amplifier is provided with $R_1 = 90\ k\Omega$, $R_2 = 22\ k\Omega$, $R_C = 5\ k\Omega$, $R_E = 1\ k\Omega$, $V_{CC} = 12\ V$, $V_{BE} = 0.7\ V$, $r_e' = \frac{26\ mV}{I_E}$, $\beta = 100$.

Calculate

a) V_2

b) I_E

c) r_e'

d) A_V and

e) $Z_{i\,(base)}$

43) a) An op-amp subtractor circuit is given with $V_1 = 1\ V$, $V_2 = 2\ V$, $R_f = 50\ k\Omega$, $R_1 = 10\ k\Omega$, $R_2 = 10\ k\Omega$ and $R_3 = 50\ k\Omega$. Determine the output voltage. **(3)**

b) An op-amp inverting amplifier circuit is given with $V_{in} = 3\ V$, $R_f = 20\ k\Omega$ and $R_i = 10\ k\Omega$. Calculate the output voltage. **(2)**

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