



ನೋಂದಣಿ ಸಂಖ್ಯೆ :																				
Registration No. :																				

X1 – 2025

ವಿಷಯ ಸಂಕೇತ / Subject Code	40 (NS)
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ಎಲೆಕ್ಟ್ರಾನಿಕ್ಸ್ (ವಿದ್ಯುನ್ಮಾನ ವಿಜ್ಞಾನ) / 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 answer will be considered for evaluation.*
 - 2) *Part – D consists of two sections. Section – I is of essay type questions and Section – II is of problems.*
 - 3) *Circuit diagram and truth tables must be drawn wherever necessary.*
 - 4) *Solve the problems with necessary formulae.*
 - 5) *For the 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) An example for the voltage controlled device is
 - a) BJT
 - b) FET
 - c) SCR
 - d) TRIAC

P.T.O.



- 2) The operating point is also called as
- a) Quiescent point
 - b) Cutoff point
 - c) Saturation point
 - d) Breakdown point
- 3) Conduction angle for class-B power amplifier is
- a) 60°
 - b) 180°
 - c) 270°
 - d) 360°
- 4) What happens to voltage gain of an amplifier, when negative feedback is applied?
- a) Increases
 - b) Decreases
 - c) Remains same
 - d) Oscillates
- 5) The rate of change of output voltage in op-amp is known as
- a) Input offset voltage
 - b) CMRR
 - c) Output offset voltage
 - d) Slew rate
- 6) The active component used in op-amp filter circuit is
- a) Resistor
 - b) Op-amp
 - c) Capacitor
 - d) Inductor
- 7) Name the high frequency stability oscillator
- a) Colpitts oscillator
 - b) Hartley oscillator
 - c) Wein bridge oscillator
 - d) Crystal oscillator
- 8) The layer of ionosphere which remains during both day and night time is
- a) F Layer
 - b) E Layer
 - c) D Layer
 - d) Troposphere



- 9) The intermediate frequency in AM radio receiver is
- a) 455 Hz
 - b) 455 KHz
 - c) 455 MHz
 - d) 455 GHz
- 10) The common name of SCR is
- a) Diode
 - b) TRIAC
 - c) MOSFET
 - d) Thyristor
- 11) 8421 BCD code for $(59)_{10}$ is
- a) 0101 1010
 - b) 0110 1001
 - c) 0101 1001
 - d) 1001 0101
- 12) In a flip-flop, SET condition stands for
- a) $Q = 0, \bar{Q} = 0$
 - b) $Q = 0, \bar{Q} = 1$
 - c) $Q = 1, \bar{Q} = 0$
 - d) $Q = 1, \bar{Q} = 1$
- 13) How many timers are present in 8051 microcontroller?
- a) 1
 - b) 2
 - c) 3
 - d) 4
- 14) 'Not equal to' operator in C programming is
- a) \sim
 - b) \neq
 - c) $=!$
 - d) $!=$
- 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) combinational b) damped c) twice d) comparator e) thermal f) highest]

16) CE amplifier has _____ power gain.

17) Zero crossing detector is an application of _____.

18) Tank circuit produces _____ oscillations.

19) Carrier swing is _____ the frequency deviation in FM.

20) Half adder is a _____ circuit.

PART – B

III. Answer **any five** questions :

(5 × 2 = 10)

21) Mention any two types of transistor biasing circuits.

22) In an amplifier bandwidth is 1 MHz and $\beta = 0.01$. Determine bandwidth when negative feedback is introduced. Given $A = 100$.

23) A transistor colpitts oscillator is provided with $L = 10\mu\text{H}$ and $C_{\text{eq}} = 1\text{nF}$. Determine frequency of oscillations.

24) Write the expression for P_T in terms of P_C . What is the upper limit of m_a in AM?

25) Name the four types of power converters.

26) Draw the logic circuit of a full adder using 3 - input X-OR gate and basic gates.

27) Distinguish between ROM and RAM.

28) Write a note on Wifi.



PART – C

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

- 29) Mention the differences between FET and BJT.
- 30) Derive an expression for input impedance of voltage series negative feedback amplifier.
- 31) Sketch nature of oscillator output waveform for a) $A\beta > 1$ b) $A\beta < 1$ c) $A\beta = 1$
- 32) What is noise signal? Differentiate between radio horizon and optical horizon.
- 33) Draw the circuit diagram of diode detector. Sketch the waveforms at different stages.
- 34) Determine V_{dc} and I_{dc} of SCR HWR. Given firing angle is 60° , rms voltage to the rectifier is 230 V and a load of 20Ω is connected.
- 35) Convert $(1010)_2$ into gray code using X-OR gate.
- 36) Write any three uses of fiber optic communication.

PART – D (Section I)

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

- 37) Explain working of CC amplifier. Draw input and output waveforms.
- 38) Derive an expression for the output voltage of an op-amp summing amplifier.
- 39) Realize NOT, AND, OR and XOR gates using NAND gates.
- 40) Write ALP program to divide 3 FH by 2 AH. In which registers, quotient and remainder are stored after execution of the program.
- 41) Write a C program to accept two integer number and print whether they are equal or not equal.



PART – D (Section II)

VI. Answer **any two** questions :

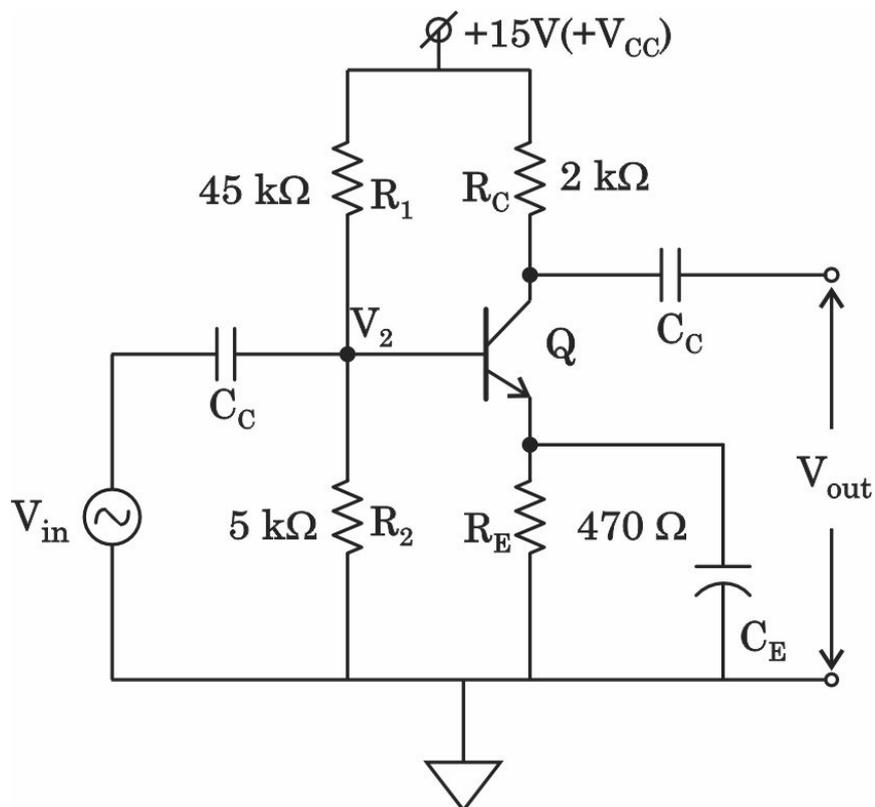
(2 × 5 = 10)

42) For the given CE amplifier circuit using silicon transistor.

Calculate

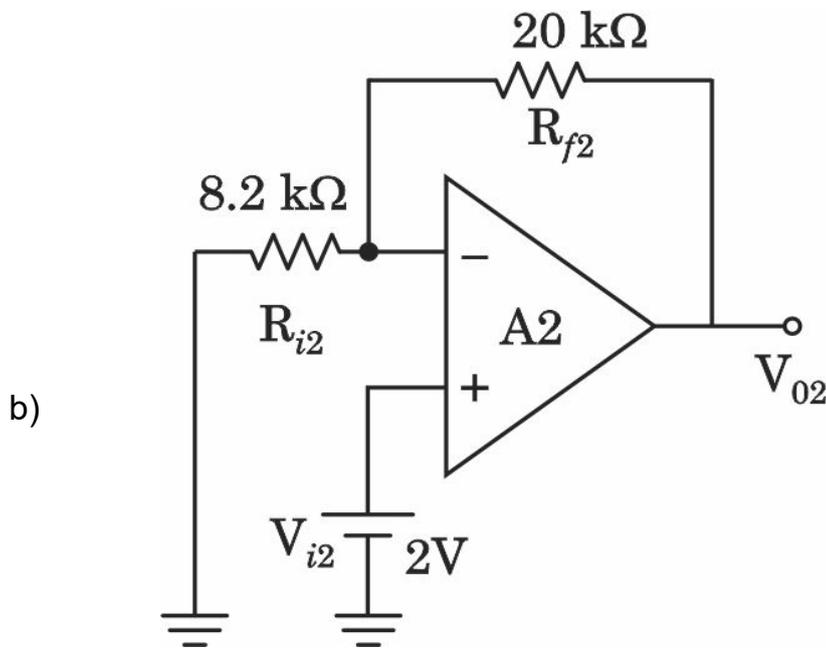
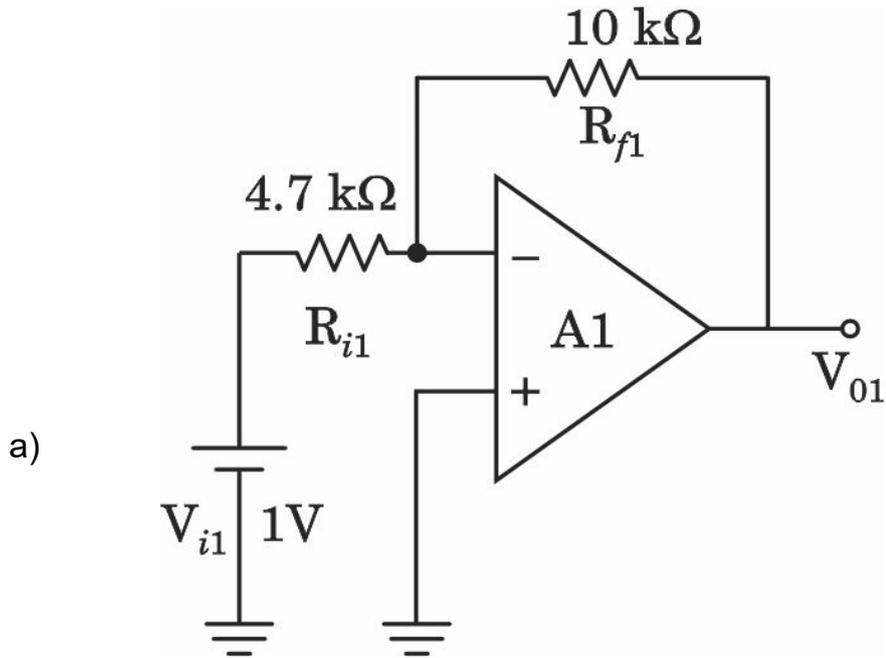
- (i) V_2 (Voltage drop across R_2)
- (ii) I_E
- (iii) r'_e
- (iv) A_V
- (v) A_i

Given $r'_e = \frac{26\text{mV}}{I_E}$, $V_{BE} = 0.7\text{V}$ and $\beta = 150$.





43) Calculate output voltages for the op-amp circuits shown below. Given $V_{i1} = 1\text{ V}$, $V_{i2} = 2\text{ V}$. (2 + 3)





44) A sinusoidal carrier voltage $v_c = 60 \sin 2\pi \times 10^5 t$ is modulated by a sinusoidal voltage $v_m = 30 \sin 2\pi \times 10^3 t$.

- Draw the frequency spectrum of AM
- Calculate bandwidth.

45) Simplify the Boolean expression

$$Y(A, B, C, D) = \sum m(1, 4, 5, 11, 14) + \sum d(0, 10, 15)$$

Draw the NAND gate equivalent circuit to realize the simplified equation.

PART – E

(For Visually Challenged Students Only)

42) For the CE amplifier circuit using silicon transistor $R_1 = 45 \text{ k}\Omega$, $R_2 = 5 \text{ k}\Omega$, $R_C = 2 \text{ k}\Omega$, $R_E = 470 \text{ }\Omega$, $V_{CC} = +15 \text{ V}$, $\beta = 150$, $V_{BE} = 0.7 \text{ V}$, $r'_e = \frac{26 \text{ mV}}{I_E}$

Calculate

- V_2 (Voltage drop across R_2)
- I_E
- r'_e
- A_v
- A_i **(5)**

43) a) An op-amp inverting amplifier is provided with $R_{f1} = 4.7 \text{ k}\Omega$, $R_{i1} = 10 \text{ k}\Omega$, $V_1 = 1 \text{ V}$. Determine output voltage V_{01} . **(2)**

b) An op-amp non-inverting amplifier is provided with $R_{i2} = 8.2 \text{ k}\Omega$, $R_{f2} = 20 \text{ k}\Omega$, $V_2 = 2 \text{ V}$. Determine output voltage V_{02} . **(3)**
