

4148629



ನೋಂದಣಿ ಸಂಖ್ಯೆ :

Registration No. :

A1 – 2024

ವಿಷಯ ಸಂಕೇತ /

Subject Code

40 (NS)

# ಎಲೆಕ್ಟ್ರಾನಿಕ್ಸ್ (ವಿದ್ಯುನ್ಮಾನ ವಿಜ್ಞಾನ) / ELECTRONICS

[ಸಮಯ: 3 ಗಂಟೆ 15 ನಿಮಿಷಗಳು]

[ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 48]

[ಗರಿಷ್ಠ ಅಂಕಗಳು : 70]

[Time : 3 Hours 15 Minutes]

[Total No. of questions : 48]

[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. Section – II is of problems.
  - 3) For questions having diagrams, alternate questions are given at the end of the question paper, in a separate Section for Visually Challenged Students.
  - 4) Truth table and circuit diagram must be drawn wherever necessary.
  - 5) Solve the problems with necessary formulae.

## PART – A

I. Select the correct answer from the choices given :

(15 × 1 = 15)

1) The relation between  $\mu$ ,  $r_d$  and  $g_m$  in JFET is

a)  $r_d = \mu \cdot g_m$

b)  $g_m = \mu \cdot r_d$

c)  $\mu = g_m \cdot r_d$

d)  $\mu = \frac{g_m}{r_d}$



- 2) The transistor biasing circuit which provides better stabilization
- a) Voltage divider bias
  - b) Emitter feedback bias
  - c) Collector feedback bias
  - d) Fixed bias
- 3) The power amplifier through which current flows for only half cycle of Input Signal
- a) Class A
  - b) Class B
  - c) Class C
  - d) Class AB
- 4) What happens to the voltage gain of an amplifier, when voltage series negative feedback is applied?
- a) Remains same
  - b) Decreases
  - c) Increases
  - d) Oscillates
- 5) Number of op-amp in IC 741 is
- a) 2
  - b) 4
  - c) 1
  - d) 3
- 6) A special case of non inverting operational amplifier in which  $V_O = V_i$
- a) Buffer
  - b) Integrator
  - c) Differentiator
  - d) Logarithmic amplifier
- 7) Conditions for sustained oscillations
- a)  $|AB| < 1$
  - b)  $|AB| > 1$
  - c)  $|AB| = 0$
  - d)  $|AB| = 1$
- 8) The layer of atmosphere which reflects the radio waves
- a) Troposphere
  - b) Stratosphere
  - c) Ionosphere
  - d) Mesosphere



- 9) AM wave is distorted when
- a)  $m_a = 0$
  - b)  $m_a = 1.5$
  - c)  $m_a = 0.5$
  - d)  $m_a = 1$
- 10) The common name of SCR
- a) TRIAC
  - b) BJT
  - c) Thyristor
  - d) MOSFET
- 11) The logic expression for X-OR gate
- a)  $A \cdot B$
  - b)  $\overline{A \oplus B}$
  - c)  $A + B$
  - d)  $A \oplus B$
- 12) 8421 BCD code for  $[52]_{10}$
- a) 10101111
  - b) 01010010
  - c) 01000111
  - d) 10001000
- 13) Bits of data hold by Register A of 8051
- a) 64 bits
  - b) 32 bits
  - c) 16 bits
  - d) 8 bits
- 14) The size of a float data type in C program
- a) 4 bytes
  - b) 8 bytes
  - c) 1 byte
  - d) 2 bytes
- 15) The standard form of MTSO
- a) Mobile Telephone Switching Office
  - b) Mobile Technology Switching Office
  - c) Mobile Technology Switching Offer
  - d) Mobile Technology System Office





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

[ a) unity   b) amplitude   c) universal   d) biasing   e) electrons   f) feedback ]

16) Current conduction in n-channel JFET is due to \_\_\_\_\_.

17) Applying suitable voltage across the terminals of a transistor is called \_\_\_\_\_.

18) The current gain of CB amplifier is nearly \_\_\_\_\_.

19) In frequency modulation \_\_\_\_\_ of the carrier wave remains same.

20) NAND gate is also known as \_\_\_\_\_ gate.

#### PART – B

III. Answer any five questions :

(5 × 2 = 10)

21) What is heat sink? Why it is used?

22) Draw the DC equivalent circuit for CE amplifier.

23) The loop gain  $A\beta$  of a negative feedback amplifier is 20. If  $BW = 10$  KHz find the bandwidth of an amplifier with feedback ( $BW_f$ ).

24) A Wien bridge oscillator has  $R_1 = R_2 = 1$  k $\Omega$  and  $C_1 = C_2 = 0.1$   $\mu$ F. Determine the frequency of oscillations.

25) Write the symbol of power diode and draw V-I characteristics curve in forward bias mode.

26) Write the truth table of full adder.



- 27) Distinguish between RAM and ROM.
- 28) Mention any two types of operators in C program.
- 29) Compare Wifi with bluetooth.

### PART – C

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

- 30) Mention the differences between FET and BJT.
- 31) Write any three advantages of negative feedback in amplifier.
- 32) What is piezoelectric effect? Draw the circuit diagram of crystal oscillator.
- 33) Determine the frequency of Hartley oscillator, when  $L_1 = 2 \text{ mH}$ ,  $L_2 = 4 \text{ mH}$  and  $C = 10 \text{ nF}$ .
- 34) Draw the block diagram of basic communication system and explain each block.
- 35) Mention the characteristics of good Radio receiver.
- 36) Determine  $V_{dc}$  and  $I_{dc}$  of SCR-HWR. Given firing angle is  $0^\circ$  and rms voltage of ac input to the rectifier is 230 V and load is  $10 \Omega$ .
- 37) Convert  $Y = AB + \bar{B}C$  into canonical SOP form.
- 38) Mention any three uses of Satellite Communication.

### PART – D (Section I)

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

- 39) With circuit diagram, input and output waveforms, explain the working of two stage RC coupled CE amplifier.
- 40) With circuit diagram, derive an expression for output voltage of op-amp differentiator.



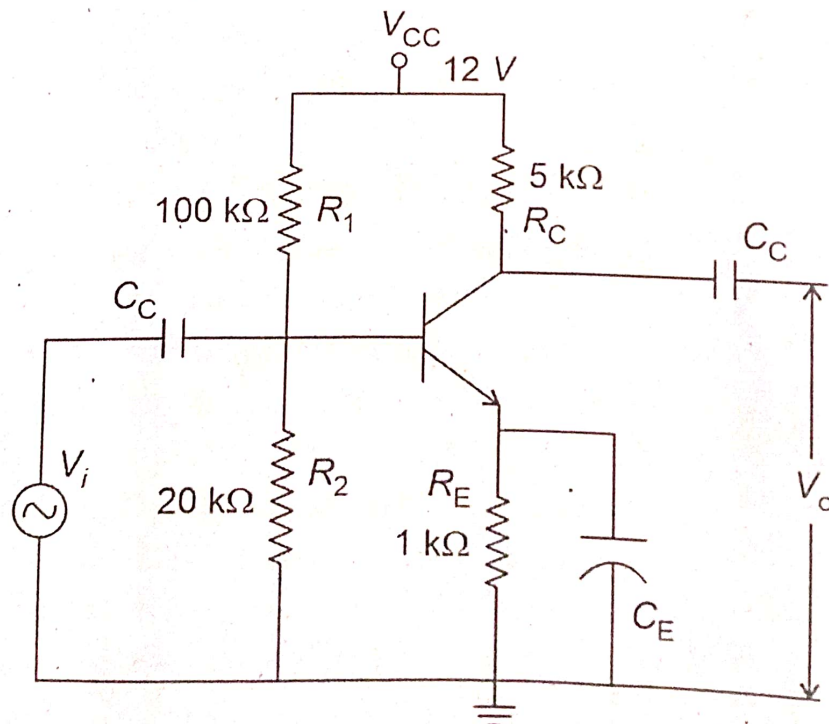
- 41) Draw the block diagram of superheterodyne AM receiver with necessary waveforms. Explain the function of each block briefly.
- 42) What is flip-flop? Draw the circuit of clocked SR flip flop and write its truth table.
- 43) Write assembly language program to add 1 AH and 05 H. Save the result in R0. What is the content of R0 after execution of the program?
- 44) Write a C program to accept radius in float and print area of the circle.

### PART – D (Section II)

VI. Answer **any two** questions :

(2 × 5 = 10)

- 45) For the transistor CE amplifier circuit given below : Calculate (a)  $Z_o$  (b)  $Z_{i(\text{base})}$  (c)  $A_v$  (d)  $A_i$  and (e)  $A_p$ . Given  $I_E = 1.3 \text{ mA}$ ,  $r'_e = \frac{26 \text{ mV}}{I_E}$ ,  $V_{BE} = 0.7 \text{ V}$  and  $\beta = 100$ .

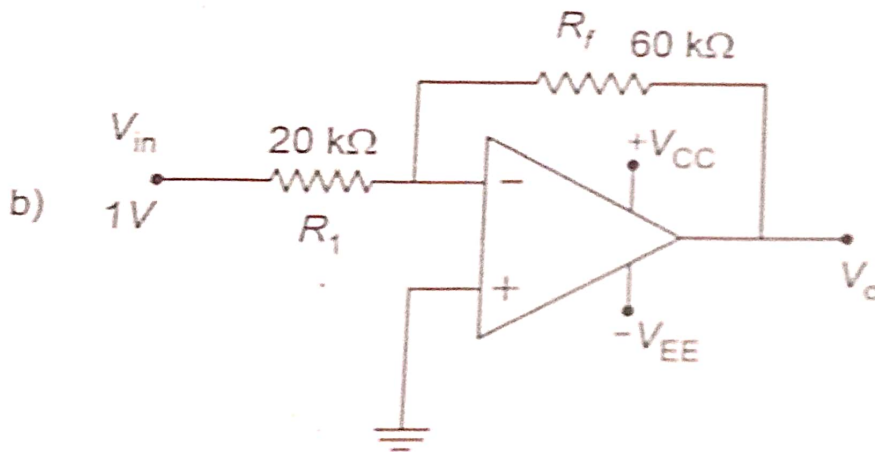
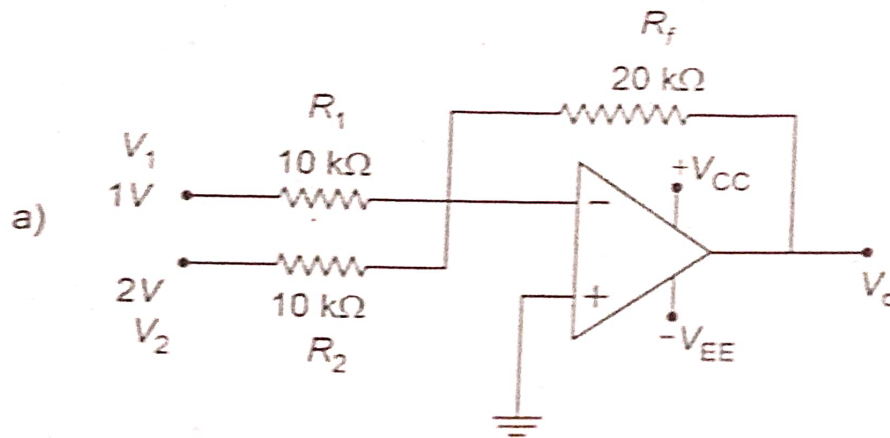






46) Find the o/p voltage for the op-amp circuits given below.

(3 + 2)



47) AM transmitter with carrier power of 12 kilowatt is modulated to a depth of 100%. Calculate

(a) Total power

(b) Side band power

48) Simplify the boolean expression  $Y = \sum m(0, 3, 4, 7, 8, 11, 12) + \sum d(14, 15)$  using K map. Realise the simplified expression using basic gates only.

**PART – E****(For Visually Challenged Students Only)**

- 45) A transistor CE amplifier is given with  $R_1 = 100 \text{ k}\Omega$ ,  $R_2 = 20 \text{ k}\Omega$ ,  $R_C = 5 \text{ k}\Omega$ ,  $R_E = 1 \text{ k}\Omega$ ,  $V_{CC} = +12 \text{ V}$ ,  $V_{BE} = 0.7 \text{ V}$ ,  $I_E = 1.3 \text{ mA}$ ,  $r'_o = \frac{26 \text{ mV}}{I_E}$ ,  $B = 100$ . Calculate (a)  $Z_o$  (b)  $Z_{i(\text{base})}$  (c)  $A_v$  (d)  $A_i$  and (e)  $A_P$
- 46) a) An op-amp adder circuit is given with  $R_1 = 10 \text{ k}\Omega$ ,  $R_2 = 10 \text{ k}\Omega$ ,  $R_f = 20 \text{ k}\Omega$ ,  $V_1 = 1 \text{ V}$ ,  $V_2 = 2 \text{ V}$ . Determine the output voltage  $V_o$ .
- b) An op-amp inverting amplifier circuit is given with  $R_1 = 20 \text{ k}\Omega$ ,  $R_f = 60 \text{ k}\Omega$ ,  $V_{in} = 1 \text{ V}$ . Evaluate the output voltage  $V_o$ . **(3 + 2)**
-