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S. Y. B. Sc. (Electronics) (Sem. - III) Examination

March - 2023

Electronics : Paper - III

Electronics Circuits and Applications

Time: 1 Hour] **[Total Marks: 50**

સૂચના : / Instructions

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **S. Y. B. Sc. (Electronics) (Sem. - III)**

Name of the Subject :

☛ **Electronics : Paper - III Electronics Circuits and Applications**

Subject Code No.: **1903000203020091**

Seat No.:

Student's Signature

(2) Symbols used have their usual meaning.

(3) Each MCQ Q. 1 to Q. 16 carries one mark.

(4) Each MCQ Q. 17 to Q. 33 carries two marks.

***O.M.R. Sheet* ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ *O.M.R. Sheet*ની પાછળ છાપેલ છે.**
Important instructions to fillup O.M.R. Sheet are given on back side of the provided O.M.R. Sheet.

SECTION - I

Q. 1. Hybrid equivalent circuit for transistor is a

A) Small signal model
B) Large signal model
C) Both A & B
D) None

Q. 2. Trans-conductance factor g_m is related to

A) BJT
B) FET
C) UJT
D) None

Q. 3. For FET input current is generally assumed to be

A) Zero
B) Infinity
C) Negative
D) Positive

Q. 4. h_{fb} is

A) A positive number
B) A negative number
C) Zero
D) None

Q. 5. Current gain (A_i) for CB amplifier is

A) A positive number
B) A negative number
C) Zero
D) All the above

Q. 6. Input resistance for CE amplifier is

A) Greater than h_{ib}
B) Less than h_{ie}
C) Equal to h_{ib}
D) Greater than h_{ie}

Q. 7. In class B amplifier the Q – point is located

A) At the centre of the active region
B) Near the saturation region
C) Near the cut off region
D) Below the cut off region

Q. 8. CC amplifier is used as

A) Voltage amplifier
B) Current amplifier
C) Power amplifier
D) Buffer

Q. 9. The co-ordinates of operating point of a small signal amplifier are

A) (v_{ce}, i_c)
B) $(-V_{CE}, I_C)$
C) (V_{CE}, I_C)
D) $(-v_{CE}, i_C)$

Q. 10. What is the phase difference between input voltage and output voltage in a common emitter amplifier?

A) 180
B) 360
C) 0
D) 90

Q. 11. If the operating point changes, _____ results

A) Thermal runaway
B) Faithful amplification
C) Unfaithful amplification
D) Damage of transistor

Q. 12. The best biasing circuit is _____.

A) Emitter biasing circuit
B) Fixed base biasing circuit
C) Collector to base biasing circuit
D) Potential divider biasing circuit

Q. 13. The causes of instability of operating point are

A) Small input resistance of transistor
B) Temperature and transistor parameter
C) Temperature only
D) All the above

Q. 14. Which is beta independent biasing circuit?

A) Fixed bias circuit
B) Emitter bias circuit
C) Collector to base bias circuit
D) Voltage divider bias circuit

Q. 15. The cause of small voltage gains for an RC coupled amplifier in the high frequency region compared to mid frequency region is due to

A) Coupling capacitors
B) Series capacitor
C) Shunt capacitor
D) None

Q. 16. In bias compensation technique we can stabilize collector current due to variation in

A) Temperature only
B) Transistor parameter only
C) Temperature and Transistor parameter
D) None

SECTION - II

Q. 17. Find out the lower cut off frequency of an RC coupled amplifier with Input resistance R = 1 kΩ and coupling capacitor C_c = 1 μF

A) 159 Hz
B) 159 kHz
C) 159 MHz
D) None

Q. 18. Calculate the current gain of common base amplifier using approximate hybrid model. h_{fe} = 280, h_{ie} = 1 kΩ and h_{re} = 0.00015.

A) 0.99
B) –280
C) 281 kΩ
D) –281 kΩ

Q. 19. For proper operation of transistor as an amplifier,(common emitter configuration) base emitter junction should be _____ and collector emitter junction should be _____.

A) (reverse biased, forward biased)
B) (forward biased, reverse biased)
C) (forward biased, forward biased)
D) (reverse biased, reverse biased)

Q. 20. Find the value of R_c of voltage divider bias circuit for the following data.

$I_{cq} = 10\,mA$, $\beta = 80$, $V_{ceq} = 8V$, $V_{cc} = 20\,V$.

A) $10\,\Omega$ B) $1\,k\Omega$

C) $10\,k\Omega$ D) None

Q. 21. An emitter bias circuit is configured with $R_B = 430\,k\Omega$, $R_C = 2.0\,k\Omega$, $\beta = 50$, $R_E = 1\,k\Omega$ and $V_{cc} = 20\,V$. Find its collector emitter voltage.

A) 13.97 mV B) 1.397 V

C) 13.97 V D) None

Q. 22. The equations relating the input and output voltages and currents in a transistor's hybrid equivalent circuit are given by

A) $V_1 = h_i I_1 + h_r V_2$, $I_2 = h_f I_1 + h_o V_2$

B) $I_1 = h_i I_1 + h_r V_2$, $V_2 = h_f I_1 + h_o V_2$

C) $V_1 = h_i I_1 - h_r V_2$, $I_2 = h_f I_1 - h_o V_2$

D) $V_2 = h_i I_1 + h_r V_2$, $I_1 = h_f I_1 + h_o V_2$

Q. 23. In class A amplifier the conduction angle is

A) 180° B) 360°

C) 270° D) 0°

Q. 24. Using approximate hybrid model calculate the input resistance of common emitter amplifier with bypassed Re. $h_{fe} = 280$, $h_{ie} = 1\,k\Omega$ and $h_{re} = 0.00015$.

A) $1\,\Omega$ B) $10\,k\Omega$

C) $1\,k\Omega$ D) $1\,M\Omega$

Q. 25. Find the value of R_E of voltage divider bias circuit for the following data.

$I_{cq} = 10\,mA$, $\beta = 80$, $V_{ceq} = 8V$, $V_{cc} = 20V$.

A) $200\,\Omega$ B) $2\,k\Omega$

C) $10\,k\Omega$ D) None

Q. 26. Which condition must be satisfied for a voltage divider biasing circuit so that it becomes independent of β?

A) $R_E = R_2$ B) $R_E = 10R_2$

C) $\beta R_E = 10R_2$ D) $\beta R_2 = 10R_E$

Q. 27. A voltage divider bias circuit is configured with $R_1 = 82\,k\Omega$, $R_2 = 22\,k\Omega$, $R_C = 5.6\,k\Omega$. $\beta = 50$, $R_E = 1.2\,k\Omega$ and $V_{cc} = 18V$. What is its collector emitter voltage?

A) 4.54 V B) 4.54 mV

C) 5.45 V D) None

Q. 28. Shockley's equation is

A) $I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$ B) $I_D = I_{DSS}\left(1 + \frac{V_{GS}}{V_P}\right)^2$

C) $I_D = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)$ D) None

Q. 29. The device parameters for N channel FET are :

Maximum drain current(I_{DSS}) = 10 mA, pinch-off voltage $V_p = -4V$. calculate the drain current for $V_{GS} = 0V$.

A) 0 mA B) 10 mA

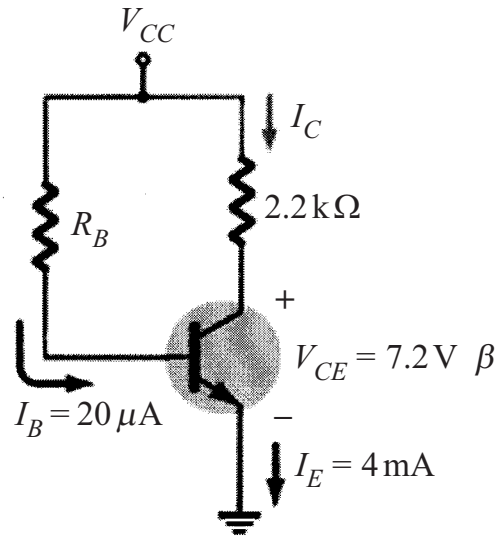
C) 10 A D) 10 A

Q. 30. A silicon transistor is used for making an amplifier using voltage divider bias circuit with emitter bias having a power supply of 20V, $R_1 = 22\,k\Omega$ and $R_2 = 5\,k\Omega$, then what will be the value of voltage at the emitter terminal?

A) 20 V B) 3 V

C) 0.7 V D) 0.3 V

Q. 31. In the figure given below Find out β.



A) 199 B) 398

C) 19.9 D) None

Q. 32. In potential divider bias circuit, V_{CC} = 20 V; R_1 = 12 kΩ; R_2 = 3.9 kΩ, R_C = 3.6 kΩ and R_E = 1 kΩ. What is the emitter voltage?

A) 6.7 V B) 5.3 V

C) 4.2 V D) 3.8 V

Q. 33. An RC coupled amplifier has lower cut off frequency of 1 kHZ and upper cut off frequency of 100 kHZ. What will be its bandwidth?

A) 100 kHz B) 99 kHZ

C) 1 kHz D) None

SPACE FOR ROUGH WORK