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B.Tech. (Sem - 3rd)

ELECTRONICS DEVICES AND CIRCUITS

SUBJECT CODE : EC -201

Paper ID : [A0301]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) How movement of electrons differ from movement of holes in semiconductors.
- b) The rms output voltage of bridge rectifier is 20 V. What is PIV across the diodes?
- c) Find the value of β if $\alpha = 0.98$ for a transistor.
- d) What is ripple factor?
- e) Distinguish between h_{fe} and h_{FE} .
- f) Among emitter, collector and which is lightly doped and why?
- g) Explain the LC filter used in rectifiers.
- h) Why biasing of a FET is required?
- i) What is thermal run away?
- j) Distinguish between coupling and bypass capacitor.

Section - B

(4 × 5 = 20)

- Q2)** What is the basic principle of working of LCD's? How these differ from LED's.

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P.T.O.

Q3) A CB transistor amplifier uses a voltage source of internal resistance $R_s = 200 \Omega$ and the load resistance is $R_l = 1200 \Omega$. The h-parameters are $h_{ib} = 24 \text{ ohm}$, $h_{rb} = 4 \times 10^{-4}$, $h_{fb} = -0.98$ and $h_{ob} = 0.6 \mu\text{A/V}$. Calculate the current gain, input impedance, voltage gain and overall current gain.

Q4) For an N-channel JFET drain current with gate shorted = 8.7 mA pinch off voltage is -1 V . Find the value of

- (a) Drain current.
- (b) Transconductance.

Q5) An output wave form displayed on an CRO provided the following measured value

- (a) $V_{cemin} = 1.2 \text{ V}$, $V_{cemax} = 22 \text{ V}$, $V_{ceq} = 10 \text{ V}$
- (b) $V_{cemin} = 2 \text{ V}$, $V_{cemax} = 18 \text{ V}$, $V_{ceq} = 10 \text{ V}$.

Determine the percent second harmonic distortion in each case.

Q6) What is JFET? Distinguish between JFET and MOSFET.

Section - C

(2 × 10 = 20)

Q7) What is a rectifier? Compare and contrast half and full wave rectifiers.

Q8) What are three differential amplifier configurations? Briefly compare and contrast these configurations.

Q9) Draw the h-parameter equivalent circuit for a common emitter and derive for voltage gain, current gain, input resistance and output resistance.
