

ELECTRONIC DEVICES AND CIRCUITS

SUBJECT CODE: EC - 201

Paper ID-A0301

Time: 03 Hours

Maximum Marks: 60

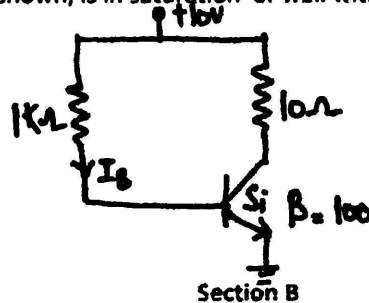
Instructions to Candidates:

- 1) Section - A is compulsory consisting of ten questions carrying Two marks each.
- 2) Section - B contains Five questions carrying Five marks each and student has to attempt any Four questions.
- 3) Section - C contains Three questions carrying Ten marks each and student has to attempt any two questions.

Section - A

Q 1)

- (a) What is potential barrier in a diode? How it gets established?
- (b) What is reverse recovery time?
- (c) Show that the maximum dc output power in a half wave single phase rectifier occurs when the load resistance equals the diode resistance.
- (d) Explain punch through effect.
- (e) Define h_{fe} of a transistor and sketch a graph of h_{fe} versus I_c .
- (f) Explain how the mutual conductance of a FET varies with I_D and V_G .
- (g) Sketch small signal model of an FET at high frequencies.
- (h) How does I_{CBO} varies with temperature?
- (i) Explain the role of coupling capacitor in an amplifier circuit.
- (j) Find out whether the transistor shown, is in saturation or well within saturation.



- Q 2) What are the two types of capacitances across PN junction? Derive the relationship between transition capacitances and reverse bias potential. Also plot the graph between bias potential and capacitance

Q3) A bridge rectifier is supplying a load of 200mA at 30V. It uses a π -section filter with the choke of 0.5H and two capacitors each of $80\mu\text{F}$. Assume supply frequency of 50 Hz. Find (i) the input rms voltage of the secondary of the transformer and (ii) the percentage ripple in the output.

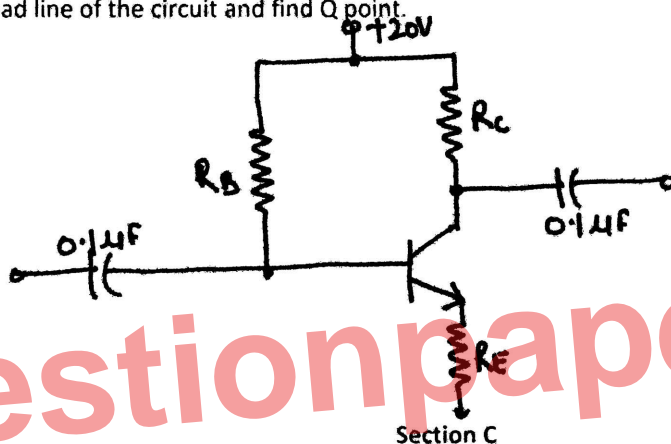
Q4) Why the h- parameters are preferred over other parameters? Draw the hybrid equivalent circuit for common base configuration and find the expressions for current gain, voltage gain and input impedance.

Q5) What are the advantages of the FET over a conventional bipolar junction transistor? Define Pinch-off voltage, amplification factor and drain resistance of FET. Explain with the help of circuit diagram, how an FET is used as a voltage dependent resistor.

Q6) In a small signal amplifier shown, $h_{fe} = 100$, $h_{ie} = 560\Omega$, $R_C = 2\text{k}\Omega$, $R_E = 1\text{k}\Omega$, $R_B = 600\text{k}\Omega$, h_{ie} and h_{oe} are negligible.

(a) Draw the h-parameter equivalent for the amplifier. Calculate the input and output impedances and the voltage gain.

(b) Give the dc load line of the circuit and find Q point.



Q7) What is the difference between the construction of enhancement type MOSFET and a depletion type MOSFET? Explain the operation and characteristics of N- channel MOSFET in enhancement mode.

Q8) Draw a neat sketch of simple capacitor filter for a half wave rectifier and show the output voltage across the load. Making suitable approximations, determine the dc output voltage as well as the ripple factor of the half wave rectifier with capacitor filter.

Q9) State the factors to be considered while designing a biasing circuit for a good transistor voltage amplifier. What is bias compensation and why is it needed? Explain with circuit diagram how is compensation accomplished for variations in base emitter voltage due to temperature variations.

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