M.Sc. First Semester (Applied Electronics) (New) (CBS)
15002 : Electronics Devices & Circuits : 1 AE 2

P. Pages : 2

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Time : Three Hours

04l7

Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Explain the diode characteristics in forward & reverse bias. Also define capacitances of diode. 7

   b) In a bridge rectifier the transformer is connected to 220V, 50Hz mains and the turns ratio of the step down transformer is 11 : 1. Assuming ideal diodes find Vdc, η and PIV. 6

OR

2. a) Explain diode as clipper. Design a double ended clipper whose output is $\pm$ 5V for $10\sin wt$ input signal. 7

   b) Explain Zener breakdown. Draw & explain Zener diode characteristics. 6

3. a) Draw & Explain input and output characteristics of CE transistor. 7

   b) Explain 'Q' point & define stability factor for transistor amplifier. 7

OR

4. a) A transistor with $\beta = 50$, $V_{BE} = 0.7V$ $V_{CC} = 22.5$ V and $R_C = 5.6$ KΩ is used in a voltage divider biasing circuit. It is designed to establish the Quiescent point at $V_{CE} = 12V$, $I_C = 1.5$ mA & stability factor $S \leq 3$ find R_1, R_2 & RE. 7

   b) A CE amplifier is drawn by a voltage source of internal resistance $r_s = 800\Omega$ and load impedance is $R_L = 1000\Omega$. The h-parameters are $h_{ie} = 1$KΩ, $h_{re} = 2 \times 10^{-4}$ $h_{fe} = 50$ and $h_{oe} = 25 \mu A/V$. Compute current gain. Input resistance. voltage gain and output resistance. 7

5. a) Explain constructional details and working of FET with the help of its characteristics. 7

   b) Compare BJT and FET. 6

OR

6. a) Explain the Depletion MOSFET with the help of drain & transfer characteristics. 7

   b) For an N - channel JFET $I_{DSS} = 20$ mA, $V_{gs(on)} = -8V$ and $g_{mo} = 5000\mu\mho$. Determine the drain current and transconductance at $V_{gs} = -4V$. 6

7. a) Draw & explain RC coupled amplifier & also explain frequency response. 7

   b) For a two stage direct coupled amplifier $V_{CC} = 12V$, $R_1 = 100 K\Omega$, $R_2 = 20 K\Omega$, 7
   $R_C = 10 K\Omega$, $R_E = 2K\Omega$. $\beta_1 = \beta_2 = 100$. Determine the overall voltage gain.
   Neglect V_{BE}.

OR

8. a) Show that input resistance is improved in Darlington emitter follower. 7

   b) What is the effect of negative feedback? Compare the various feedback connection. 7

9. a) Prove that power efficiency of Class A power amplifier is 25%. 7

   b) What is cross over distortion? How is it overcome? 6

OR

10. a) Draw & explain Hartley oscillator. Determine the frequency of oscillation of Harley 7
    oscillator for $C = 100 PF$, $L_1 = 30 \mu H$, $L_2 = 1 \times 10^{-8}$ Henry.

    b) Explain R-C phase shift oscillator. 6

11. a) Explain working of tunnel diode with the help of characteristic state the applications. 7

    b) Explain Schottky diode. Give its applications. 6

OR

12. a) Draw and explain the characteristic of phototransistor. Explain working principle and state 7
    applications.

    b) How varactor diode is used for tunning circuit? Explain. 6

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