

B.E. Third Semester (Electronics & Telecommunication) (New)
Electronics Devices & Circuits : 3 ET 03

P. Pages : 2

Time : Three Hours



AU - 2514Add

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 book.

1. a) A silicon diode has 5 mA in forward bias at 0.7V. Calculate its reverse saturation current. Now if its forward voltage is increased to 0.75V, calculate new current in diode at room temperature. 7
b) What are the capacitances associated with the PN junction diode? Explain in detail. 6

OR

2. a) 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 the diodes to be ideal, find 7
i) The voltage across the load ii) I_{dc}
iii) PIV
b) Explain the importance of filters with neat diagrams. 6
3. a) What are the drawbacks of the collector to base bias circuit? How can it be removed? Explain with circuit diagram. 7
b) A single stage CE amplifier has a BJT with $h_{ie} = 1.2k\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 60$, $h_{oe} = 30\mu A/V$ along with $R_S = 900\Omega$, $R_L = 1k\Omega$. Calculate A_i , A_{is} , A_{vs} , R_i and A_p . 7

OR

4. a) Draw and explain common base configuration in detail. 7
b) Draw the circuit for collector to base bias and derive the stability factor S for the same. Also explain how this circuit provides stability against change in temperature. 7
5. a) Explain the principle of oscillations. What are the conditions for sustained oscillations? 7
b) Explain the effect of feedback on Bandwidth of amplifiers. 6

OR

6. a) A tuned collector oscillator circuit has a fixed inductance of $100\mu H$ and has to be tunable over the frequency band of 500KHz to 1500KHz. Find the range of variable capacitor to be used. 7
b) Derive the expression of input and output resistance in Voltage-Series feedback. 6

7. a) Why does the cascading of stages increase the gain-band width product of an amplifier? 6
b) What is the necessity of Darlington connection? Explain the biasing problem associated with it. How is it overcome? 7

OR

8. a) A cascaded amplifier uses 3 stages having the individual gain 10, 20 and 40 respectively. What is the overall voltage gain in dB. 3
b) Explain the necessity of impedance matching in amplifiers. 4
c) Draw and explain direct coupled transistor amplifier. 6
9. a) For a power transistor working in class A operation has zero signal power dissipation of 8W. If the a.c. output power is 3W, determine: 7
i) Power rating of transistor. ii) Collector efficiency.
b) What is cross over distortion? Explain any one method to overcome it. 7

OR

10. a) What is meant by harmonic distortion in power amplifiers? Show that the total power in power amplifier is 7
$$P = (1 + D^2) P_1$$

Where, D is total distortion
 P_1 is the output power due to fundamental component of the distorted signal.
b) Explain the operation of class B push pull amplifier with circuit diagram and waveforms. 7
11. a) What are the biasing schemes available to achieve the required bias in JFET? Explain any one in detail. 7
b) An n-channel JFET has $I_{DSS} = 8\text{mA}$ and $V_p = -5\text{V}$. Determine the minimum values of V_{DS} for pinchoff region and the drain current I_{DS} for $V_{GS} = -2\text{V}$. 6

OR

12. a) Explain with the help of circuit diagram the working of UJT relaxation oscillator. 7
b) Explain the construction, operation and $V_{DS} - I_D$ and transfer characteristics of n-channel depletion type MOSFET. 6
