

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

P. Pages : 2

Time : Three Hours



AV - 3292

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.

1. a) Explain effect of temperature on diode characteristics. for Si diode with $I_0 = 2.5 \mu A$ at 300K, Find the forward voltage at a forward current of 10 mA. 7

- b) Explain diode as a clipper. How will you obtain square wave from sine wave? 7

OR

2. a) A 230 V, 50Hz voltage is applied + the primary of 4: 1 stepdown transformer used in a bridge rectifier having a load resistance of 600Ω . Assuming the diodes + be ideal, determine dc output voltage, dc power delivered to the load, PIV, ripple factor, rectification efficiency. 7

- b) Explain capacitor filter & derive expression for ripple factor. Design a capacitor filter for full wave rectifier operating at 400 Hz freq. & ripple factor is 10% and load of 500Ω . 7

3. a) Explain transistor as switch. 6

- b) Calculate the stability factor of voltage divider bias transistor amplifier.
 $R_1 = 10k\Omega$, $R_2 = 100k\Omega$, $R_E = 1000\Omega$, $V_{CE} = 9V$, $R_C = 1k\Omega$ 7

OR

4. a) Explain DC load line concept. How Q point is defined? Explain stability. 5

- b) The h parameter of a transistor used in CE amplifier are given as
 $h_{ie} = 1k\Omega$, $h_{fe} = 100$, $h_x = 2 \times 10^{-4}$ and $h_{oc} = 20\mu A/V$. If $R_c = 5k\Omega$, $R_s = 1k\Omega$,
Determine A_I , R_I , A_V , A_{VS} , R_o and R_{os} 8

5. a) Draw and explain the drain characteristics of JFET. Define drain resistance, transconductance & amplification factor. 9

- b) Calculate drain current for N channel JFET with $I_{DSS} = 40mA$, $V_g(\text{off}) = -10v$, $V_{gs} = -5v$. 4

OR

6. a) Draw and explain drain & transfer characteristics of N-channel MOSFET. 7

- b) Draw & Explain structural view of CMOS transistor. 6

AV - 3292

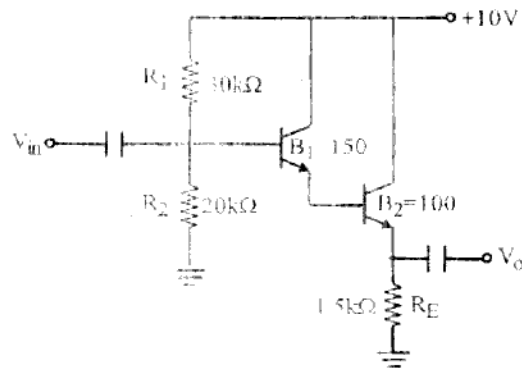
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7. a) Explain R-C coupled amplifier. Also explain frequency Response. 7
b) Explain direct coupled amplifier and its frequency response. 7

OR

8. a) Derive the expression for I/P & O/P resistances, Voltage gain of common source FET amplifier with fixed bias. 7
b) For a given Darlington amplifier determine 7
i) Overall current gain. ii) Ac emitter resistance of each diode.
iii) Total I/P resistance. iv) Overall voltage gain



9. a) Prove that power efficiency of class B power amplifier is 78.5% How crossover distortion is removed? 7
b) Class A amplifier has $V_{CC} = 20V$, $V_{CE(sat)} = 10V$, $I_{CQ} = 600mA$ and collector load Resistor $R_L = 16\Omega$ AC output varies by 1300 mA with ac I/P signal. Determine power efficiency of the amplifier. 6

OR

10. a) Explain Hartley Oscillator in detail. What is the condition for oscillation? 6
b) What is negative feedback? State the advantages. Explain Voltage series feedback connection. 7
11. a) Explain principle of operation, constructional details of P/N diode. State its applications. 7
b) How varactor diode is used as tuning circuit? Explain. 6

OR

12. a) Explain working principle of phototransistor its characteristics & applications. 7
b) Explain LED structural details, working & its applications. 6
