

GANPAT UNIVERSITY

B. TECH SEM- III (BM&I) REGULAR EXAMINATION- NOV-DEC 2015

2BM301: LINEAR ELECTRONICS

TIME: 3 HRS

TOTAL MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.

(2) Figures on right indicate marks.

(3) Conventional terms and notations are used.

(4) Draw figures, circuits, write equations and assume data wherever necessary.

SECTION: I

Q.1 (10)

- a) Design the fixed bias circuit to have $V_{CE} = 5\text{ V}$ & $I_C = 1.5\text{ mA}$. Assume supply voltage is $+12\text{ V}$ and $\beta = 50$ 4
- b) Explain how shifting of Q-point in different regions can lead to waveform distortion. 4
- c) Define: 1) DC Load line 2) Extrinsic semiconductor 2

OR

Q.1 (10)

- a) Explain input-output characteristics of Transistor in Common Base configuration 4
- b) Determine Q-point for Emitter bias CE amplifier circuit in which $V_{CC} = 20\text{ V}$, $R_B = 430\text{ k}\Omega$, $R_C = 2\text{ k}\Omega$, $R_E = 1\text{ k}\Omega$. Calculate for $\beta = 50$, $\beta = 100$. 4
- c) Define: 1) Feedback 2) Barrier potential 2

Q.2 (10)

- a) Draw h-parameter model for Common base configuration. Determine its input impedance (Z_i), Output impedance (Z_o) and voltage gain (A_v) equations. 5
- b) Derive equation of gain for positive feedback amplifier. If amplifier voltage gain increase from 10 to 500 with positive feedback then find amount of output fed back to amplifier input. 5

OR

Q.2 (10)

- a) Draw re model for Common Emitter voltage divider bias configuration with bypass capacitor and derive related equation 5
- b) Derive the formulae: $\alpha = \frac{\beta}{1+\beta}$ 2
- c) State conditions to start and sustain oscillation in circuit. Write applications of oscillator. 3

- Q.3 (10)
- Differentiate between: 1) Majority and minority charge carriers 2) Semiconductor, conductor and insulator 5
 - Write advantages of negative feedback. State and explain types of negative feedback 5

SECTION: II

- Q.4 (10)
- Explain working of class A transformer coupled power amplifier. Draw AC load line showing Q-point. 4
 - Write equations and calculate overall and collector efficiency of Class A power amplifier 4
 - Write difference between Class A and Class B amplifier 2

OR

- Q.4 (10)
- Write a note on TRIAC 5
 - Plot transfer characteristics of JFET and explain its working operation. 5

- Q.5 (10)
- Enlist and explain any one mode in which D- MOSFET can work with its drain and transfer characteristics 5
 - Draw symbol of UJT and explain its construction and characteristic curve. 5

OR

- Q.5 (10)
- Draw and explain characteristic curve of SCR. Show various operating regions on the graph. 5
 - How to turn on SCR? Write SCR applications 3
 - Define hold current (IH) & forward break-over voltage (VBR). 2

- Q.6 (10)
- Distinguish between: 1) BJT and FET 2) Voltage and Power Amplifier 3
 - Draw symbols: SCR and JFET 2
 - Draw circuit of Hartley Oscillator. If inductor values given for the circuit are 0.3 mH and 0.2 mH, capacitor value is 0.1 μ F. Calculate frequency of oscillation. 5

-----END OF PAPER-----