Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM- III (BME) CBCS REGULAR EXAMINATION– NOV-DEC 2016

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) Draw load line for voltage divider Bias configuration of transistor based CE amplifier. Assume R1 = 35 KΩ, R2 = 3.5 KΩ, RC = 10 KΩ, RE = 1.2 KΩ. VCC = 18V. Determine IC and VCE for β = 50, 100. Comment on the stability of the circuit. **5**

b) What is the effect of various transistor parameters on Q-point shifting and DC load line? **3**

c) Define 1) Barrier potential 2) Minority charge carriers. **2**

OR

Q.1 **(10)**

a) Draw and Explain input and output characteristics of CE amplifier. Show different operating regions of transistor on graph. **5**

b) Design base bias circuit to have VCE = 12 V & IC = 3.5 mA and VCC = 20V. Take β = 50. **3**

c) Distinguish between: Semiconductor and conductor. **2**

Q.2 **(10)**

a) Do h-parameter analyses of Common Emitter voltage divider bias configuration with bypass capacitor and determine input/output impedance and voltage gain (Av) equations. **5**

b) Define Q-point and Thermal runaway. Which factors affect biasing stability? **3**

c) Derive the formulae: $\beta = \frac{\alpha}{1-\alpha}$. **2**

OR

Q.2 **(10)**

a) Draw re model for Common base configuration and derive related equations. **5**

b) Derive gain equation for positive feedback. An engineer was supposed to design an amplifier with gain 200 but actually got circuit gain as 150. How much feedback should be applied in order to increase gain of the circuit to the required value? **5**

Q.3 **(10)**

a) Distinguish between positive and negative feedback. Draw block diagram of voltage shunt and voltage series type feedback amplifier. **5**

b) State conditions to start oscillation in circuit. Give classification of Oscillators. **5**

SECTION: II

Q.4 **(10)**

a) Derive overall and collector efficiency of class B power amplifier. Draw circuit diagram of complementary push pull amplifier and show Q-point on AC load line. 6

b) Write difference between class A and class B power amplifier. 2

c) Draw waveform showing cross over distortion. Why it occurs in Class B amplifier? 2

OR

Q.4 **(10)**

a) Write working principle of JFET device. Draw circuit diagram and drain characteristics curve. Label different operating regions. 5

b) Explain the working of E-MOSFET in enhancement mode. 2

c) Draw drain and transfer characteristics curve of E-MOSFET. 3

Q.5 **(10)**

a) Describe the working of Hartley Oscillator. If L_1 = 0.6 mH, L_2 = 0.3 mH & C = 0.1 µF then calculate the oscillator output frequency. 5

b) Explain the construction of UJT. Draw its equivalent circuit and explain its characteristic curve. Label graph showing different regions. 5

OR

Q.5 **(10)**

a) Explain construction and working operation of SCR with suitable circuit diagram. How to turn off SCR? What is holding current (IH)? 5

b) Draw characteristic curve of SCR. Show various operating regions on the graph. 2

c) Write a note on DIAC. 3

Q.6 **(10)**

a) Draw symbols: D-MOSFET , p-channel JFET and Darlington pair. 3

b) Write full from of TRIAC and LASCR. 2

c) Distinguish between: 1) BJT and MOSFET 2) Push pull and complementary push pull amplifier. 5

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