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MLR15

Code No: A10470

MLR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

II B.Tech I Sem Supplementary Examinations- January-2017

ELECTRONIC DEVICES

(Common to CSE, IT)

Time: 3 hours

Max.Marks :75

Note: 1. This question paper contains two parts A and B.

2. Part A is compulsory which carries 25 marks. Answer all questions in part A.

3. Part B consist of 5 units. Answer any one full question from each unit. Each question Carries 10 marks and may have a, b, c as sub questions.

PART-A

1. a) A transistor has $\alpha=0.99$. What will be the base current if the emitter current is 8mA. [2M]
- b) Give two conditions of Barkhausen criterion. [2M]
- c) What is Q-point in Transistor. [2M]
- d) Write the Shockley's equation for drain current in JFET and in which region of JFET characteristics it is valid. [2M]
- e) Define Static and Dynamic resistance of diode. [2M]
2. a) A transistor has $\beta=150$. Calculate the approximate collector and base currents, if the emitter current is 12mA. [3M]
- b) What is 'thermal runaway' phenomenon in a BJT? [3M]
- c) List the factors which affect the operating point stability of transistor. [3M]
- d) Estimate the values of R and C for an output frequency of 1KHz in RC- phase shift oscillator. [3M]
- e) For a Si diode at temperature of 100°C, determine the forward voltage require to be applied. The reverse saturation current is $5\mu A, I_F=57mA$. [3M]

PART-B

3. a) With a neat diagram explain how potential barrier is formed in a PN-junction [5M]
 - b) Define Zener diode and explain the VI-characteristics of Zener diode. [5M]
- OR**
4. a) Distinguish between 'Avalanche breakdown' and 'Zener breakdown' in a PN junction Diode. [5M]
 - b) Explain V-I characteristics of an diode with the help of diode equation. [5M]
 5. a) Draw the circuit of Full wave rectifier and explain its working along with input and output waveforms. [5M]
 - b) Derive an expression for average and RMS value of full wave rectifier. [5M]

OR

6. a) For a two diode full wave rectifier with load of 2k Ω , the input voltage applied to each diode is 230 sinwt. The forward resistance of the diode is 10 Ω , calculate
 - a) peak value of current,
 - b) dc or average value of current
 - c) r.m.s value of current,
 - d) rectifier efficiency
 - e) ripple factor [5M]
- b) Derive an expression for efficiency and transformer utilization factor of half wave rectifier. [5M]

7. a) Explain the working of NPN transistor with a neat diagram and establish relationships between various currents flowing through it. [5M]
b) Compare the performance of CB, CE and CC amplifiers. [5M]

OR

8. a) Explain how transistor can be used as a Digital Switch. [5M]
b) Design a voltage divider bias circuit using transistor for $V_{CC}=15\text{v}$, $I_C=5\text{mA}$, $\beta=100$, $V_{CE}=5\text{v}$ and $V_E=5\text{v}$. [5M]

9. a) Draw the 'drain characteristics' of **n-channel** JFET and Explain the pinch-off phenomenon with relevant diagrams. [5M]
b) Discuss the operation of class-A power amplifier [5M]

OR

10. a) Distinguish between BJT and JFET. [5M]
b) Explain the construction and working of N-type depletion mode MOSFET. [5M]

11. a) Explain the basic structure of feedback amplifier and hence derive an expression for the gain of negative feedback amplifiers. [5M]
b) With a neat labeled circuit diagram of Colpitts oscillator, explain its working principle and write an expression for its frequency of oscillations [5M]

OR

12. a) Explain with a neat circuit diagram, the working of an Crystal Oscillator. [5M]
b) Discuss the various topologies of feedback circuits. [5M]
