

B.E. / B.Tech. Instrumentation Engineering (Model Curriculum) Semester-III
IN303M / IN303 - Electronics Devices & Circuits

P. Pages : 2

Time : Three Hours



GUG/W/24/14011

Max. Marks : 80

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- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Diagrams and chemical equation should be given wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) A half wave rectifier is connected to a transformer with turns ratio 2:1 find its average DC output voltage, Peak inverse voltage of diode and average value of power delivered to load with input voltage is 230V rms and load resistance is 200Ω and input frequency 50 Hz. **8**
b) Draw neat diagram and explain the working of a PN junction diode in forward bias and show its V-I characteristics. **8**

OR

2. a) Write a short notes on: **8**
 - i) Varactor diode
 - ii) Tunnel diode
b) A half wave rectifier is connected to a transformer with turns ratio 4:1 find its average DC output voltage, Peak inverse voltage of diode and output frequency if input voltage is 200 V rms with load resistance is 100Ω and input frequency 50 Hz. **8**
3. a) Give the circuit arrangement and obtain the input characteristic and the output characteristic of common emitter configuration and give the expression for β . **8**
b) Discuss thermal runaway what is the condition for thermal stability? **8**

OR

4. a) What is mean by D.C. load line? Draw the D.C. load line using common emitter configuration. **8**
b) Draw and explain voltage or self bias circuit. Mention its advantages over fixed bias circuit. **8**
5. a) Discuss the difference between BJT and FET. **8**
b) Draw and explain transfer and drain characteristics of JFET. **8**

OR

6. a) A JFET has the following parameters: $I_{DSS} = 12 \text{ mA}$; $V_{GS}(\text{off}) = -20 \text{ V}$. Plot the transfer curve for V_{GS} equal to 0 V , -5 V , -10 V , -15 V -20 V . 8
- b) Explain the construction and working of enhancement type MOSFET. 8
7. a) Draw and explain the working of class B push pull power amplifier. 8
- b) Explain the cross-over distortion in power amplifiers. 8

OR

8. a) Show that maximum collector efficiency of class A transformer coupled power amplifier is 50%. 8
- b) A power transistor working in class A operation has zero signal power dissipation of 10 Watts. If the a.c. output power is 4 watts, find 8
- i) collector efficiency
- ii) Power rating of transistor.
9. a) What are the four possible topologies of a feedback amplifier and indicate how feedback is Provided? Draw the block schematics of each. 8
- b) The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input. 8

OR

10. a) Derive the expression for frequency of oscillations in RC phase shift oscillator and obtain condition for oscillations. 8
- b) In a transistor Colpitts oscillator the value of $C_1 = 250 \text{ pF}$, $C_2 = 100 \text{ pF}$, and $L = 60 \mu\text{H}$. Find the Required gain for Oscillation and frequency of oscillations. 8
