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

_____

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

1. a) Explain the working of Varactor diode. **8**

b) Draw neat diagram and explain the working of a PN junction diode in reverse bias and show its V-I characteristics. **8**

OR

2. a) Draw the circuit diagram and explain the working of full wave bridge rectifier and derive the expression for **8**
1) dc output voltage   2) dc output current
3) ripple factor   4) Rectification efficiency

b) A half wave rectifier is connected to a transformer with turns ratio 4:l find its average DC output voltage, Peak inverse voltage of diode and output frequency if input voltage is 230 V rms with load resistance is 200 Ω and input frequency 50 Hz. **8**

3. a) If the base current of transistor is 30μA when the emitter current is 7.2 mA, what are the values of α and β ? **8**

b) Draw and explain fixed bias circuit. Mention its advantage and disadvantage. **8**

OR

4. a) A transistor has a typical of β =l50. if the emitter current is 10 mA. Calculate the value of collector and base current. **8**

b) Give the circuit arrangement and obtain the input characteristic and the output characteristic of common base configuration and give the expression for α. **8**

5. a) With the help of neat diagram explain the operation and characteristics of N-channel depletion type MOSFET. **8**

b) A JFET has the following parameters: $I_{DSS} = 6\,mA$; $V_{GS}(off) = -4.5V$. **8**

a) Determine I_D at $V_{GS} = -2$ and $-3.6V$.

b) Determine V_{GS} at $I_D = 3$ and $5.5\,V$

OR

6. a) A JFET has the following parameters: $I_{DSS} = 12\,\text{mA}$; $V_{GS}(\text{off}) = -20\,\text{V}$. Plot the transfer **8** curve for V_{GS} equal to $0\text{V}, -5\text{V} -10, \text{V} -15\text{V} -20\text{V}$.

b) Explain the construction and operation of N-channel JFET with suitable diagram. **8**

7. a) Draw the circuit and explain the working of class - A Push - Pull amplifier. **8**

b) Explain the cross - over distortion in power amplifiers. **8**

OR

8. a) Explain the operation of complementary symmetry class B power amplifier with neat **8** diagram.

b) Derive an expression for efficiency of class A amplifier. Prove that the Maximum **8** efficiency of a series fed directly coupled class A amplifier is 25 %.

9. a) Draw the circuit diagram for Colpitts Oscillator and explain its working. **8**

b) What is a Barkhausen criterion? Explain RC phase shift oscillator in detail with suitable **8** diagram and expression.

10. a) With a negative voltage feedback, an amplifier gives an output of 10 V with an input of **8** 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate (i) Gain without feedback (ii) feedback fraction mv.

b) Discuss the effect of negative feedback an. **8**
i) Voltage gain. ii) Bandwidth iii) Distortion. iv) Stability.

****