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

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Notes :   1.   Same answer book must be used for each section.
          2.   All questions carry marks as indicated.
          3.   Due credit will be given to neatness and adequate dimensions.
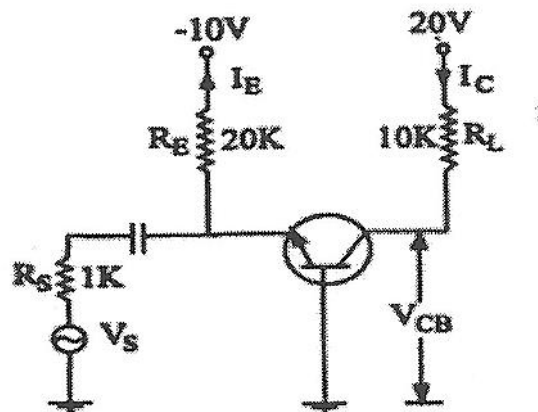   4.   Illustrate your answers wherever necessary with the help of neat sketches.

1.   a)   Draw neat diagram and explain the working of a PN junction diode in forward bias.   **8**

   b)   A half-wave rectifier using silicon diode has a secondary emf of 14.14 V(rms) with a resistance of $0.2\,\Omega$. The diode has a forward resistance of $0.05\,\Omega$ and a threshold voltage of 0.7V. If load resistance is 10 Ω, determine (i) dc load current (ii) dc load voltage (iii) voltage regulation.   **8**

OR

2.   a)   Explain Zener diode as voltage regulator.   **8**

   b)   With neat diagram explain the construction and working of LED.   **8**

3.   a)   Give the circuit arrangement and obtain the input characteristics of common base configuration and give the expression for α.   **8**

   b)   In a common base connection, the emitter current is 1mA. If the emitter circuit is open, the collector current is $50\,\mu A$. Find the total collector current. Given that $\alpha = 0.92$.   **8**

OR

4.   a)   Discuss thermal runaway what is the condition for thermal stability?   **8**

   b)   In CB circuit find (a) dc operating point and dc load line (b) collector current (c) collector emitter voltage.   **8**
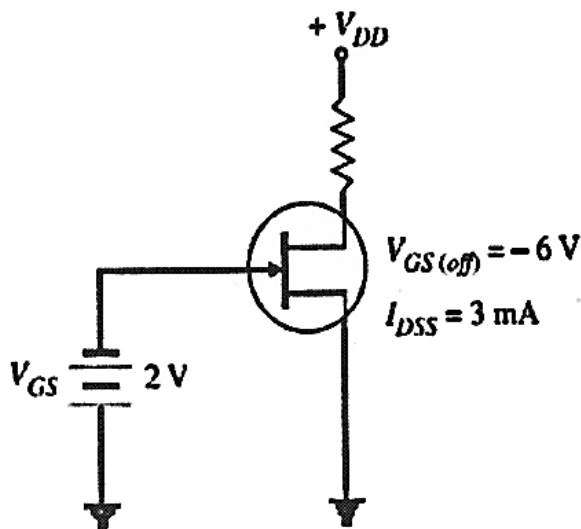

5.   a)   With the help of neat diagram explain the operation and characteristics of N-channel depletion type MOSFET.   **8**

	b)	Draw and explain drain characteristics of JFET.	8

<div align="center">OR</div>

6.	a)	Draw and explain transfer and drain characteristics of JFET.	8
	b)	Determine the value of drain current of the circuit shown in fig..	8

7.	a)	Draw and explain the working of class B push pull power amplifier.	8
	b)	A transistor power amplifier deliver an output of 10 watts with an efficiency of 45%. Determine the d.c. power input and power that must be dissipated as heat.	8

<div align="center">OR</div>

8.	a)	Explain the following terms in connection with power amplifier i) Collector circuit efficiency ii) Collector dissipation rating iii) Class A, Class B, Class C, operation iv) Harmonic distortion.	8
	b)	For a class B amplifier using a supply of VCC = 12V and driving a load of 8Ω, determine (i) maximum load power (ii) D. C. input power (iii) collector efficiency.	8
9.	a)	With help of neat sketch, explain the working of RC phase shift oscillator.	8
	b)	In a transistor Colpitts oscillator the value $C_1 = 250\text{pF}, C_2 = 100\text{pF}$, and $L = 60\mu\text{H}$. Find the required gain for Oscillation and frequency of Oscillations.	8

<div align="center">OR</div>

10.	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)	When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 50 (i) Calculate the fraction of the output voltage feedback.	8

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