Sub Code: BECT 101 **ROLL NO……..……..**

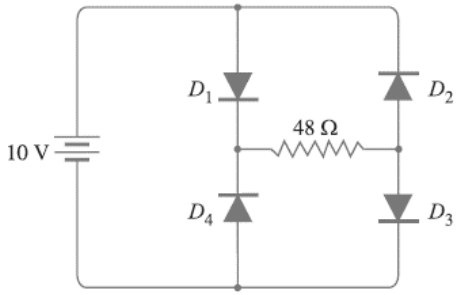
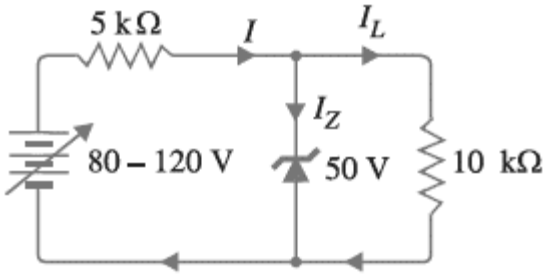
II SEMESTER EXAMINATION, 2022 – 23

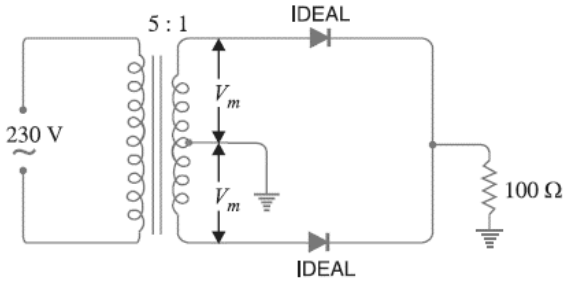
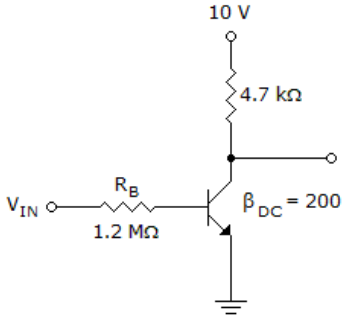
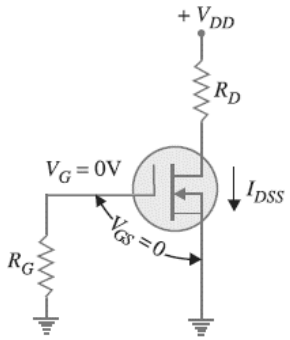
First Year , B.Tech – All Branches

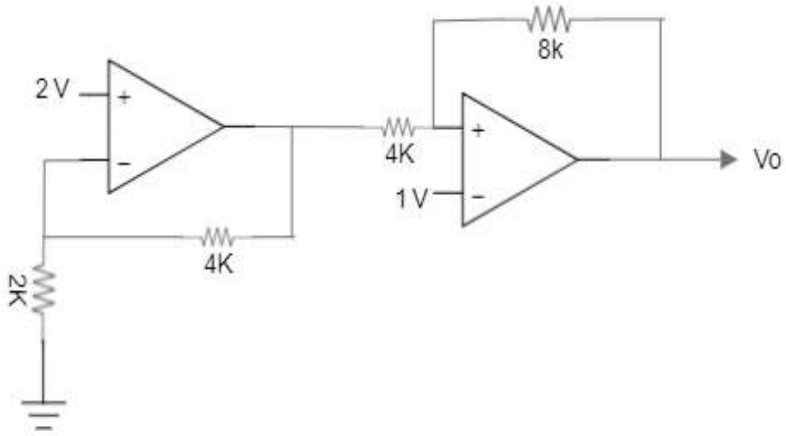
Basic Electronics Engineering

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) Describe (i) the formation of depletion region, (ii) Forward Biasing, (iii) Reverse Biasing. b) How Zener diode works as a voltage regulator? Explain with the help of its characteristics. c) What do you understand by doping? Explain intrinsic and extrinsic semiconductor with appropriate examples and figures. d) Calculate the current through 48 Ω resistor in the circuit shown in Fig. 3. Assume the diodes to be of silicon and forward resistance of each diode is 1 Ω.  e) What are the two main types of diode breakdown mechanisms? Describe each mechanism and how they occur. f) For the circuit shown in Figure, find the maximum and minimum values of zener diode current. 	5x4=20
Q 2.	**Answer any four parts of the following.** a) With respect to half wave rectifier explain (i) ripple factor, (ii) Power efficiency. b) An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10 : 1. Find (i) the output d.c. voltage and (ii) the peak inverse voltage. Assume the diode to be ideal. c) Explain Biased series clipper with input and output waveforms. d) A full-wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 20 Ω. The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50 V and load resistance is 980 Ω. Find: (i) the mean load current (ii) the r.m.s. value of load current.	5x4=20

	 d) Compare half wave rectifier with full wave rectifier on the basis of their parameters. e) How does a positive clamper circuit work? Explain its operation and waveform transformation. f) How does a bridge rectifier circuit convert an alternating current (AC) input into a direct current (DC) output? Write the advantages of using a bridge rectifier over a center-tapped full-wave rectifier?	
Q 3.	**Answer any two parts of the following.** **a)** Draw CE configuration of transistor. Sketch and explain input and output characteristics for NPN transistor. **b)** Refer to the below figure. Determine the minimum value of I_B that will produce saturation.  **c)** Explain the concept of biasing in BJT circuits. What are the different methods of biasing? Explain any one method in detail.	10x2= 20
Q 4.	**Answer any two parts of the following.** a) What is FET? Classify it and differentiate between FET and BJT. b) Determine the drain-to-source voltage (VDS) in the circuit shown in Fig. If VDD = +18V and RD = 620Ω. The MOSFET data sheet gives VGS (off) = – 8V and IDSS = 12 mA.  c) Explain the construction and working of Enhancement mode MOSFET with neat diagram.	10x2= 20
Q 5.	**Answer any two parts of the following.** a) Explain operational amplifier can be used as a differentiator and integrator. b) Calculate output voltage in circuit shown in figure below.	10x2= 20



c) Define the following with respect to the operational amplifier.
(i) CMRR
(ii) Slew rate
(iii) Input offset voltage
(iv) output offset voltage
(v) Concept of Virtual Ground.

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