	INDIAN INSTITUTE OF INFORMATION TECHNOLOGY UNA [HP] An Institute of National Importance under MoE **Saloh, Una (HP) – 177 209** **Website:** www.iiitu.ac.in

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AY 2021- 22

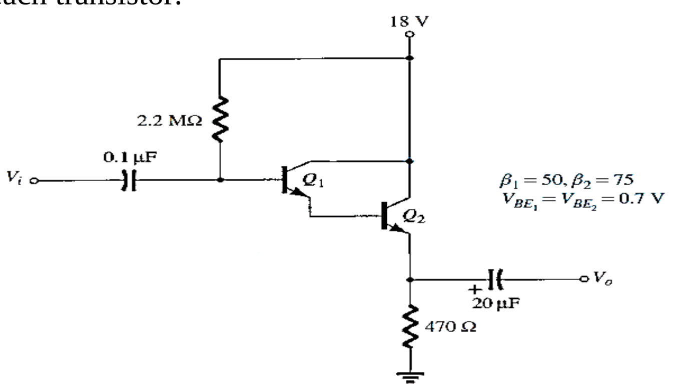
School of Computing

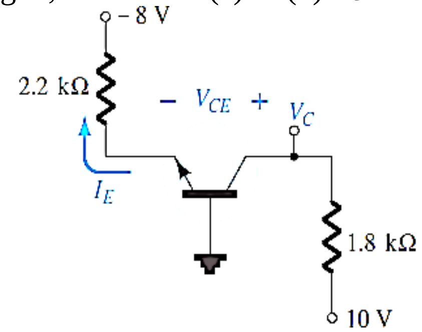
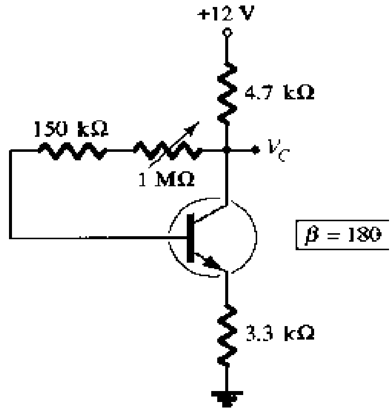
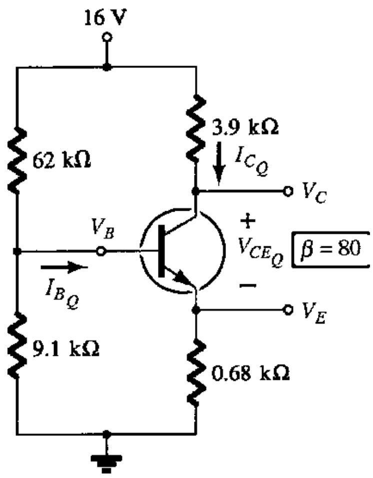
CURRICULUM: IIITUGCSE20

Cycle Test – II

29, March'22

Degree	B. Tech.	**Branch**	CSE
Semester	I		
Subject Code & Name	EEC103 (Basic Electrical and Electronics Engineering)		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Sl. No.	**Question**	**Marks**
1.a	Explain the significance of Back EMF in direct current machines.	(2)
1.b	A 220-volt dc series motor is running at 800 rpm and draws 100 A. Calculate the speed of the motor when the torque is reduced to half of its previous value. Total resistance of armature and field circuit is 0.1 ohm. Assume that magnetic circuit is unsaturated.	(2)
2.a	Explain what happens if the transformer is supplied DC power.	(2)
2.b	A 25 kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000 V, 50-Hz supply. Find the full load primary and secondary currents, secondary emf and the flux in the core.	(2)
3.a	Show the biasing arrangement for a PNP transistor in CB configuration for its working in active region.	(1)
3.b	A variation of $5\mu A$ in the base current produces a change of $1.2mA$ in the collector current. Collector-to-emitter voltage remains fixed during this variation. Solve the current amplification factor beta.	(1)
3.c	For the Darlington amplifier of Fig. 1, select the level of β_D and base current of each transistor.  Fig. 1: Circuit Diagram for Problem 3.c	(2)

4.a	For the network of Fig. 2, determine: (a) I_E (b) V_C  Fig. 2: Circuit Diagram for Problem 4.a	(1)
4.b	Explain the reason for the base current in a transistor to be usually much smaller than I_E or I_C in active operation.	(1)
4.c	Construct typical CE output characteristic curves for an NPN transistor. Label all variables. Explain in brief the computation of the beta value of the transistor from these characteristic curves.	(2)
5.a	Make use of network in Fig. 3 for determining the range of possible values for V_C using the $1M\Omega$ potentiometer.  Fig. 3: Circuit Diagram for Problem 5.a	(2)
5.b	For the network of Fig. 4, solve: i) $S(I_{CO})$ ii) $S(V_{BE})$ iii) Determine the net change in I_C if a change in operating conditions results in I_{CO} increasing from 0.2 mA to 10 mA, V_{BE} drops from 0.7 V to 0.5 V, and β increases by 25%.  Fig. 4: Circuit Diagram for Problem 5.b	(2)