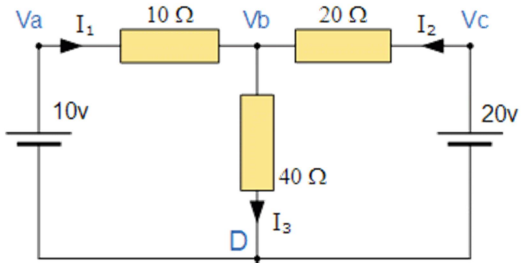
Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, 2021

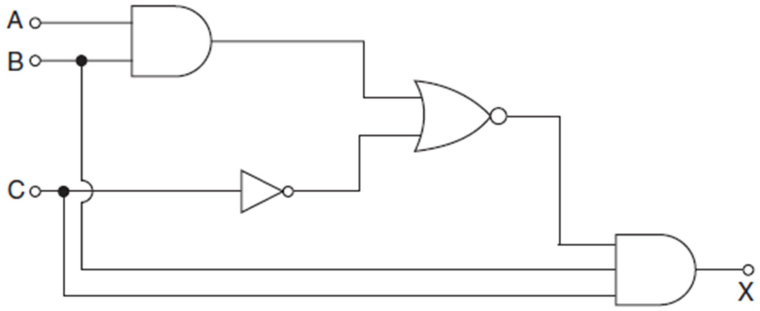
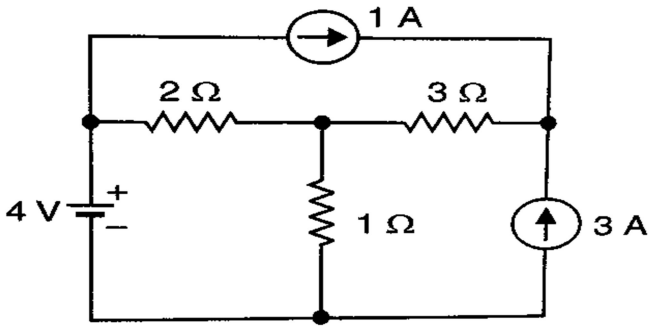
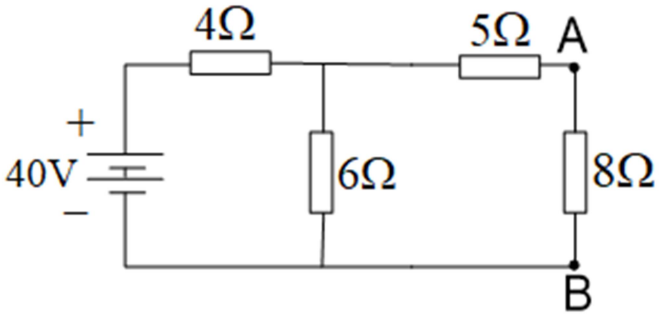
Programme Name: B. Tech APE,ASE,ECE,EEE,RSE **Semester : I**
Course Name : Basic Electronics and Electrical Engineering **Time : 03 hrs**
Course Code :ECEG 1004 **Max. Marks : 100**

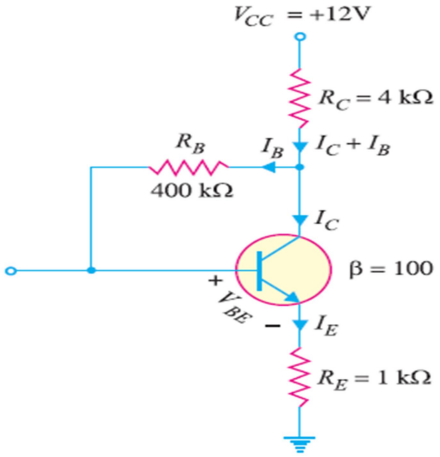
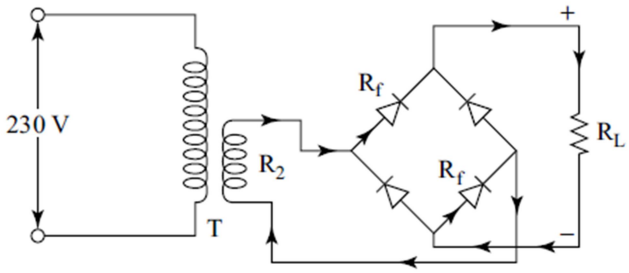
SECTION A (5Q x 4M= 20M)

S. No.	All Questions are compulsory.	Marks	CO
Q 1	Write major applications of a p-n junction diode? Discuss its important properties/behavior of V-I curve during reverse bias operation.	**4**	**CO1**
Q 2	Perform the following number system conversion: $(1101001101.1010)_2 = (\_)_8 = (\_)_{16}$	**4**	**CO2**
Q 3	Determine the current across the load of 4 + j3 ohm connected to 230 V power supply of 50 Hz frequency.	**4**	**CO2**
Q 4	Determine the Node volatge **Vb** for the givem network shon in Figure 1.  **Figure 1.**	**4**	**CO3**
Q 5	For $i = 100\,Sin\,(157t + 60^0)$, Amp, Determine the RMS current, Average current, Frequency and phase of the current source.	**4**	**CO4**

SECTION B (4X10 = Marks)

Q6	Sketch the input-output charateristcs alongwith the opearting regions of common emitter NPN configuration?	10	**CO2**
Q7 (a)	For a series RL circuit obtain the effective impedance and draw the phasor diagram for the same. A 230 V, 50 HZ sinusoidal supply is connected across a (i) resistance of 25 Ω, (ii)	**5**	**CO3**

(b)	inductance of 0.5 H, and (iii) capacitance of 100 μH. Determine the impedance and voltage across each elements.	**5**	
Q8	Determine the output Boolean expression for the given logic gate circuit shown in Figure 2.  **Fig 2**	**10**	**CO3**
Q 9	Determine the current through 1Ω resistance in Figure 3 using Thevenin's theorem.  **Figure 3.** **OR** Using Norton theorem, Find the current in 8 ohm resistor of the network shown in Figure.4  **Figure 4.**	**10**	**CO1**
	SECTION-C (2x20 M = 40 M)		
Q 10	Design a full adder circuit from combination of half adders. Also draw the truth table for the full adder to verify the circuit.	**20**	

			CO3
Q11 A	(i)Design a complete circuit schematic for a full-wave bridge rectifier that gives a DC output of 52 V, 100 Hz for an AC input of 230 V, 50 Hz. (ii)For the transistor configuration shown in figure 2 below identify the type of biasing. Determine the operating point of the transistor, if V_{CEsat} = 0.5 V	**10**	
	 Figure 5	**10**	
	OR		
	Draw and explain negative and positive series clipper circuits with their input and output voltage waveforms, respectively.		**CO4**
B (i)	In a bridge full wave rectifier circuit shown in Figure (6), assume Load resistance R_L= 500 Ω, uses a transformer turn ratio= 5:1, forward resistance (R_f) of each diode is 1Ω.	**10**	
(ii)	 Figure (6)	**10**	
	Determine: **(1)** maximum current **(2)** Average current or DC current **(3)** RMS current or AC current **(4)** Output DC voltage **(5)** AC and DC power		