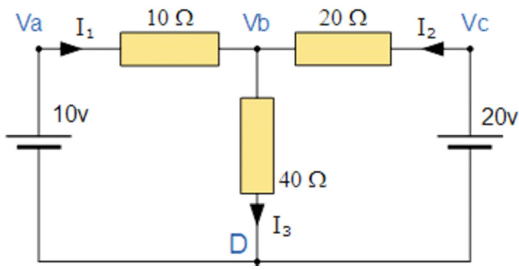


<b>Name:</b>	
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, 2021**

<b>Programme Name: B. Tech APE, ASE, ECE, EEE, RSE</b> <b>Course Name : Basic Electronics and Electrical Engineering</b> <b>Course Code : ECEG 1004</b>	<b>Semester : I</b> <b>Time : 03 hrs</b> <b>Max. Marks : 100</b>
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**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 <b>Vb</b> for the givem network shon in Figure 1. <div style="text-align: center;">  <p style="text-align: center;"><b>Figure 1.</b></p> </div>	4	CO3
Q 5	For $i = 100 \sin (157t + 60^\circ)$ , 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 charateristics 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  $\mu$ H. 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.

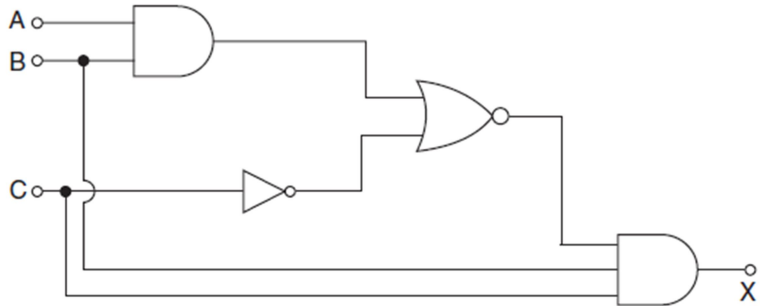


Fig 2

10

CO3

Q 9 Determine the current through 1 $\Omega$  resistance in Figure 3 using Thevenin's theorem.

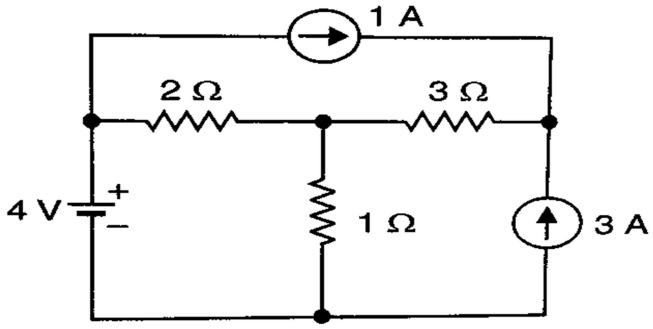


Figure 3.

OR

Using Norton theorem, Find the current in 8 ohm resistor of the network shown in Figure.4

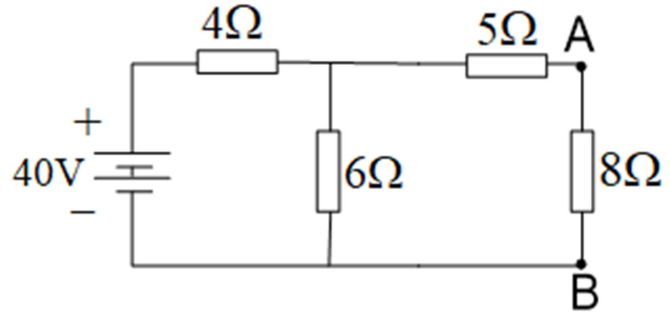


Figure 4.

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**

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  $V_{CEsat} = 0.5 \text{ V}$

10

10

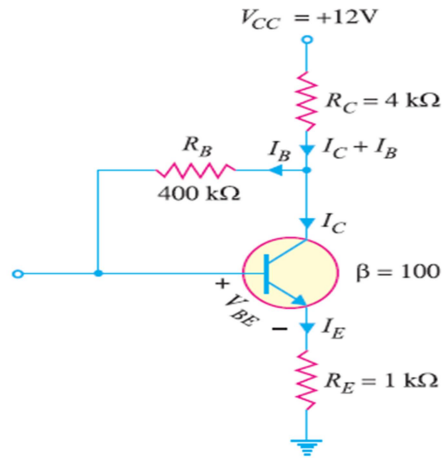


Figure 5

OR

Draw and explain negative and positive series clipper circuits with their input and output voltage waveforms, respectively.

B (i)

In a bridge full wave rectifier circuit shown in Figure (6), assume Load resistance  $R_L = 500 \Omega$ , uses a transformer turn ratio = 5:1, forward resistance ( $R_f$ ) of each diode is  $1\Omega$ .

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(ii)

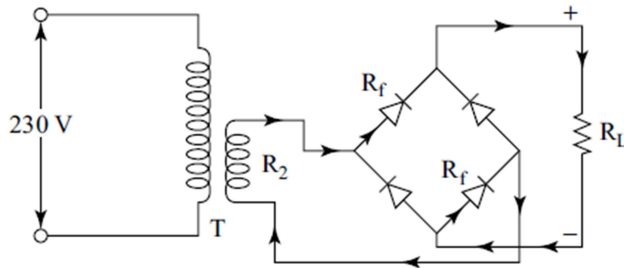


Figure (6)

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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