

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, 2021

Programme Name: B. Tech- APE, ASE, ECE, Electrical Engg, RSE

Semester : I

Course Name : Basic Electrical and Electronics Engineering

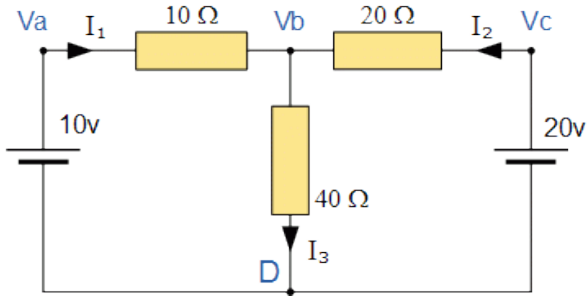
Time : 03 hrs

Course Code : ECEG-1004

Max. Marks : 100

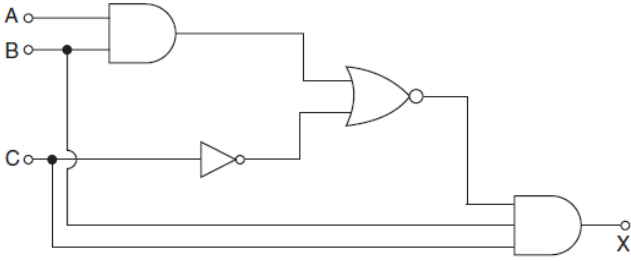
NOTE: Attempt all the sections.

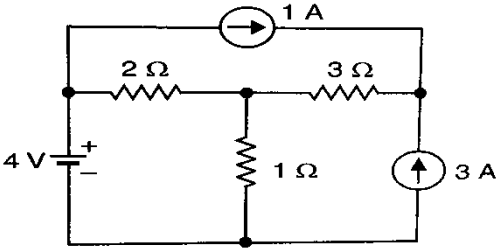
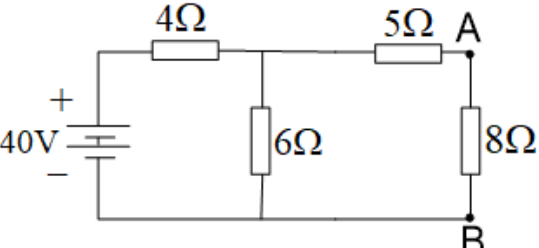
SECTION A (5Q×4M= 20M)

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.  <p style="text-align: center;">Figure- 1</p>	4	CO3
Q 5	For $i = 100 \text{ Sin } (157t + 60^\circ)$, Amp, Determine the RMS current, Average current, Frequency and phase of the current source.	4	CO4

SECTION B (4×10 = 40Marks)

Q6	Sketch the input-output charateristics alongwith the opearting regions of common emitter NPN configuration?	10	CO2
Q7	Attempt both the parts (a) For a series RL circuit obtain the effective impedance and draw the phasor diagram for the same. (b) A 230 V, 50 HZ sinusoidal supply is connected across a (i) resistance of 25 Ω, (ii) inductance of 0.5 H, and (iii) capacitance of 100 μH. Determine the impedance and voltage across each elements.	5+5	CO3

Q8	<p>Determine the output Boolean expression for the given logic gate circuit shown in Figure 2.</p>  <p style="text-align: center;">Figure- 2</p>	10	CO3
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Q 9	<p>Determine the current through 1Ω resistance in Figure 3 using Thevenin's theorem.</p>  <p style="text-align: center;">Figure 3.</p> <p style="text-align: center;">OR</p> <p>Using Norton theorem, Find the current in 8 ohm resistor of the network shown in Figure.4</p>  <p style="text-align: center;">Figure-4</p>	10	CO1
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SECTION-C (2x20 M = 40 M)

Q 10	<p>Design a full adder circuit from combination of half adders. Also draw the truth table for the full adder to verify the circuit.</p>	20	CO3
Q11	<p><u>Attempt both the parts</u></p> <p>(a) 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.</p> <p>(b) For the transistor configuration shown in figure 2 below identify the type of biasing. Determine the operating point of the transistor, if $V_{CEsat} = 0.5\text{ V}$</p>	10+10	CO4

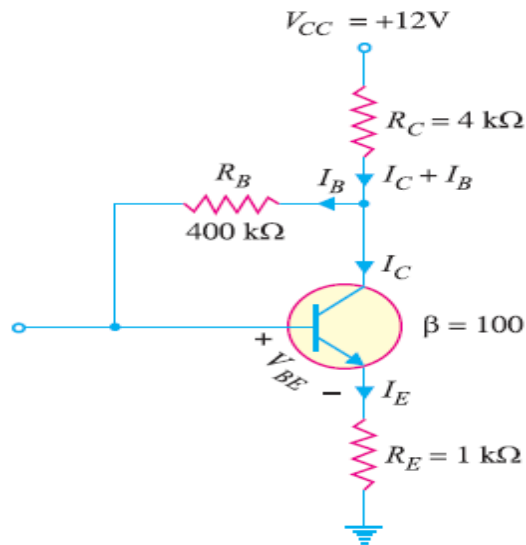


Figure 5

OR

Attempt both the parts

- (a) Draw and explain negative and positive series clipper circuits with their input and output voltage waveforms, respectively.
- (b) 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 1Ω .

10+10

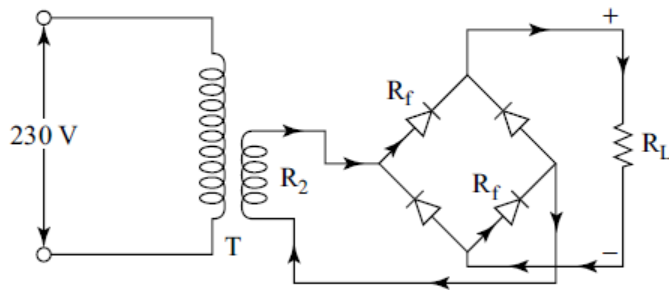


Figure- 6

Determine:

- (i) maximum current
- (ii) Average current or DC current
- (iii) RMS current or AC current
- (iv) Output DC voltage
- (v) AC and DC power