



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

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, January 2020**

<b>Course: Basic Electrical and Electronics Engineering</b>	<b>Semester: I</b>
<b>Program: B. Tech- ECE+EE+ APE-UP+ APE-Gas+ ASE+AVE</b>	<b>Time 03 hrs.</b>
<b>Course Code: ECEG -1004</b>	<b>Max. Marks: 100</b>

**SECTION A (30 Marks)**

**Each Question will carry 5 Marks**  
**Instruction: Write Briefly**

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Q 1	Write major applications of a p-n junction diode? Discuss its important properties/behavior of V-I curve during reverse bias operation.	CO1
Q 2	Explain the ripples in the rectifier output waveform. Is it useful in D.C. output signal or not? If not, how can we eliminate it?	CO2
Q 3	Give the statement of Maximum Power Transfer Theorem? What is main reason to transfer the maximum power to the load?	CO2
Q 4	What is significance of load line analysis and operating point of bipolar junction transistor?	CO3
Q 5	Attempt all the questions and <b>write answers only:</b> a. $(A351.3B)_{16} = ( )_{10}$ (1.5 Marks) b. $(156.20)_8 = ( )_2$ (1 Mark) c. $(123.12)_{10} = ( )_8$ (1.5 Marks) d. $(101110111)_2 = ( )_{GRAY CODE}$ (1 Mark)	CO4
Q 6	Explain electromechanical energy conversion principle. Differentiate the DC motor and generator systems based on suitable applications.	CO4

**SECTION B (50 Marks)**

**Each question will carry 10 marks**  
**Instruction: Attempt all the questions**

Q 1	(a) Draw and explain negative and positive series clipper circuits with their input and output voltage waveforms, respectively.  (b) Figure (1) shows the basic Zener diode circuits. What will be the circuit behavior if the Zener is (i) working properly (ii) shorted (iii) open-circuited?	CO1
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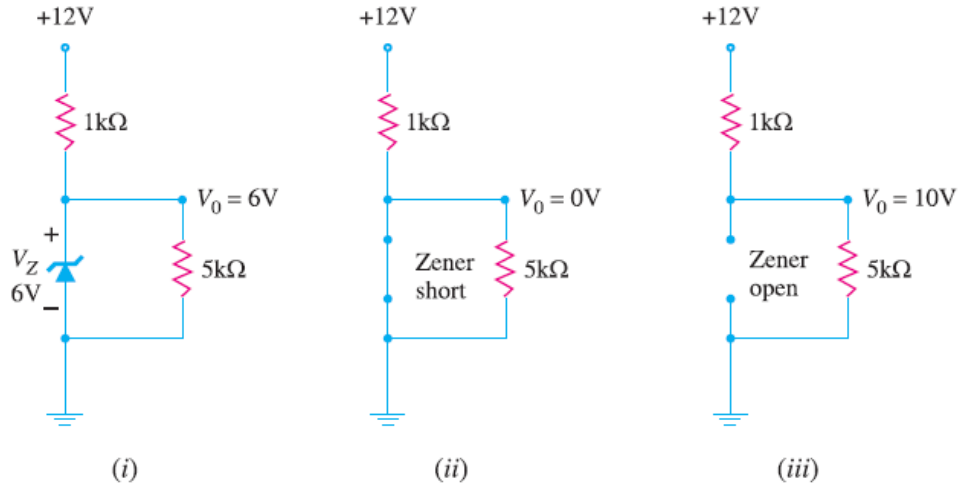


Figure (1)

Comments on each condition of circuit?

Q 2 Determine the current through  $1\Omega$  resistance in Figure (2) using Thevenin's theorem. CO2

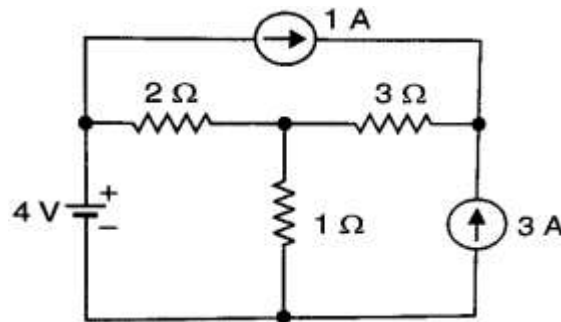


Figure (2)

OR

Find the magnitude of  $R_L$  for the maximum power transfer in Figure (3) given below. Also find the value of maximum power.

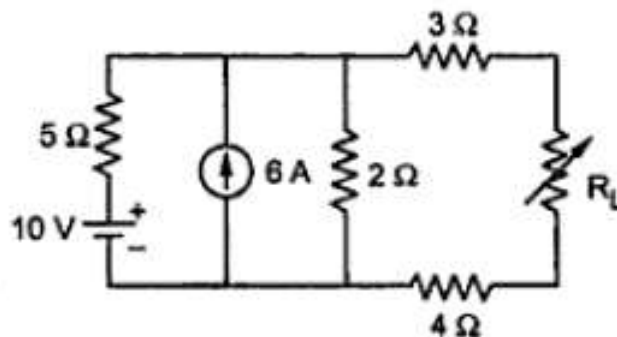
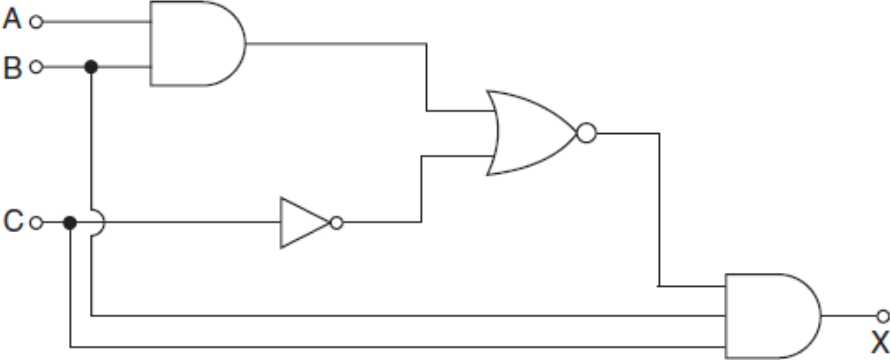


Figure (3)

Q 3 A circuit consists of a non-inductive resistor of  $10\Omega$ , an inductor of  $0.1\text{H}$  and capacitor of  $8\mu\text{F}$  in series. Calculate: (i) the resonant frequency (ii) the current at resonant frequency (iii) the voltage across each component when a supply voltage of  $220\text{V}$  at resonant frequency is applied to whole circuit. CO3

Q 4	<p>Determine the output Boolean expression for the given logic gate circuit shown in Figure (4). (i) Simplify the obtained expression using Boolean laws and De-Morgan's theorem. (ii) Design the logic gate circuit diagram of obtained expression using NAND universal logic gate.</p>  <p style="text-align: center;">Figure (4)</p>	CO3
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Q 5	<p>An 8-pole generator has 500 armature conductors and has a useful flux per pole of 0.065 Wb. What will be the e.m.f generated if it is LAP connected and runs at 1000 rpm? What must be the speed at which it is to driven to produce the same e.m.f if it is WAVE wound?</p>	CO4
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**SECTION-C**

**Each Question carries 20 Marks.**

**Instruction: Write long answer.**

Q 1	<p><b>Attempt both the parts</b></p> <p>(a) A 230/110 V single phase transformer takes an input of 350 VA at no-load and at rated voltage. The core loss is 110W. Find (i) the iron loss component of no –load current (ii) The magnetizing component of no-load current (iii) no-load power factor.</p> <p>(b) Direct current motors are named according to the connection of filed winding with the armature. Analyse <u>any two</u> types of D.C. motors in the aspect of equivalalnt circuit and mathematical part:</p> <ul style="list-style-type: none"> <li>(i) Shunt wound or shunt motor</li> <li>(ii) series wound and series motor</li> <li>(iii) compound wound motor</li> </ul>	CO4
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