

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Backlog), November 2018

B. Tech. First Year I & II Semester

Roll No.....

EE101: Electrical & Electronics Engineering

Time: 3 hours

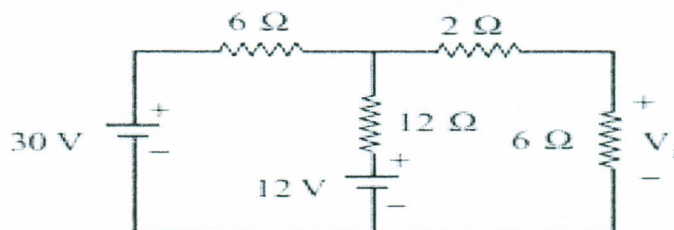
Max. Marks: 100

Instructions to students:

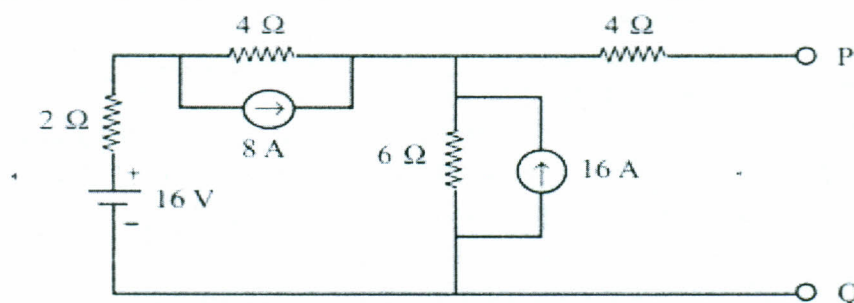
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

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- Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10
- i. Kirchhoff's law is applicable to (a) Electric circuits (b) Electronic circuits (c) Junctions in a network (d) Closed loop in a network.
 - ii. An ideal current source should have (a) Zero Internal resistance (b) infinite internal resistance (c) large value of emf (d) none of the above.
 - iii. When resistances are connected in series, the voltage across all the resistances is (a) equal (b) unequal (c) proportional to the square of the current (d) none of these.
 - iv. Superposition theorem can be applicable only to circuits having _____ elements.
(a) Non- linear (b) Passive (c) Resistive (d) Linear bilateral.
 - v. While drawing phasor diagram for series circuit, the reference phasor is
(a) Voltage (b) Current (c) Power (d) Resistance.
 - vi. In an R - L -C circuit, the phase of the current with respect to the circuit voltage will be:
(a) Leading (b) Same (c) Lagging (d) Depends upon the value of L & C.
 - vii. Transformer core is laminated to: (a) Reduce the copper losses (b) Reduce the core losses
(c) Reduce the eddy current losses (d) None of these.
 - viii. If the readings of the two wattmeters in the 2-wattmeter method of power measurement are 4.5 kW and 3.5 kW respectively and the latter reading has been obtained after reversing the current coil of the wattmeter. What will be the total power in kW ?
(a) 1 (b) 3.5 (c) 4.5 (d) 8
 - ix. When forward bias is applied to a junction diode, it (a) increases the potential barrier (b) decreases the potential barrier (c) reduces the majority-carrier current to zero (d) reduces the minority-carrier current to zero.
 - x. The bridge rectifiers are preferred because (a) they require small transformer (b) they have less peak inverse voltage (c) they need small transformer and also have less peak inverse voltage (d) they have low ripple factor.
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- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- i. State the basis for selecting the node voltage and mesh current techniques for circuit analysis.
 - ii. Define form factor and peak factor.
 - iii. What are the applications of step-up and step-down transformers?
 - iv. Explain why a junction between p-type and n-type materials creates a contact potential.

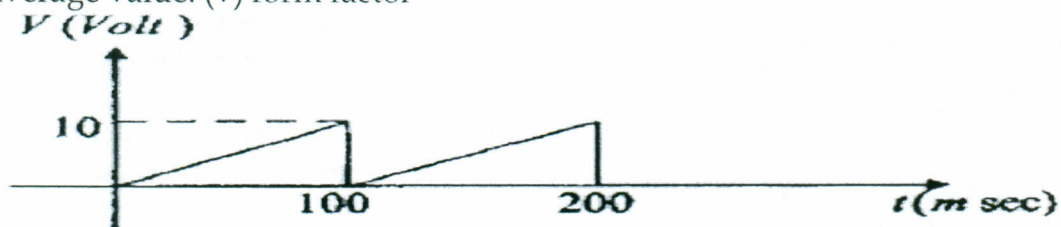
- Q.3A Derive the necessary equations for converting a star network into an equivalent delta network. 05
- Q.3B Find the voltage V_1 across 6 ohm resistance and power consumption using nodal analysis method. 05



- Q.4A State and explain Norton's theorem. How is it applied for solving a network? 05
- Q.4B Find thevenin's equivalent circuit for the ckt shown in figure. 05



- Q.5A With the help of block diagram describe the working of a satellite communication and its short note on earth station receiver. 05
- Q.5B A periodic voltage wave form has been shown in fig. Determine: 05
- (i) Frequency of wave form (ii) wave equation for $0 < t < 100$ m sec. (iii) RMS value (iv) Average value. (v) form factor



- Q.6A Explain the construction and working principle of a single phase transformer. 05
- Q.6B A 20 kVA, single-phase transformer has a turn ratio of $5/2$. The primary is connected to a 1000 V, 50 Hz supply. Find the secondary voltage, rated value of primary and secondary currents and also the maximum value of the flux. 05

OR

- Q.6B A series RLC circuit consisting of a resistance of 10Ω , inductance 0.15 H and capacitance of $100 \mu\text{F}$ is connected across a 230 V, 50 Hz source. Calculate: (i) the impedance (ii) the current (iii) Power factor (iv) the power consumption. 05

- Q.7A Distinguish between conductors, semiconductors and insulators. 05
- Q.7B With the help of V-I characteristics, describe the working principle of Zener diode. 05
Mention also the properties of zener diode when compared to ordinary diode.

OR

- Q.7B Describe in detail the working of an NPN bipolar junction transistor. 05
- Q.8 A balanced 3-phase load consists of three coils, each of resistance 10 ohms and inductive reactance of 6 ohms, is connected to a 415 V, 50 Hz supply. Determine the power factor, line current, active power, reactive power and apparent power, when the coils are (a) Star connected (b) Delta connected. 10
- Q.9A What do you mean by series resonance? What is power factor of an R-C series circuit and explain how it is different to R-L series circuit. 10
- Q.9B Two wattmeters connected to read the total power in a three phase system supplying a balanced load read 12.5 kW and 2.5 kW, respectively. Calculate the total active power. With the help of suitable phasor diagrams, explain the significance of (a) equal wattmeter readings and (b) a Zero reading on one of the wattmeters. 10

OR

- Q.9B Draw the block diagrams of a Super-hetrodyne receiver and explain the function of each block. What is the basic principle of super-heterodyne receiver? 10