

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), April-May 2016

B. Tech. (ME/CHE/CE) First Year Second Semester

EE101/

Roll No.....

EE201: 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.

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. Conversion of a voltage source into a current source and vice versa is undertaken to make numerical computations (a) more difficult (b) more accurate (c) quicker (d) easier.
- 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. The "Superposition theorem" is essentially based on the concept of (a) duality (b) linearity (c) reciprocity (d) non-linearity.
- v. While drawing phasor diagram for series circuit, the reference phasor is (a) Voltage (b) Current (c) Power (d) Resistance.
- vi. What is the form factor of pure sine wave?
(a) 1.11 (b) 1.414 (c) 1.57 (d) 0.909
- 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. A step-up transformer increases (a) voltage (b) current (c) power (d) frequency.
- 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. Zener diode is used as the main component in dc power supply for:
(a) Rectification (b) voltage regulation (c) filter action (d) both (a) and (b).

Q.2 Short answer type questions (4 questions @ 2.5 marks) 10

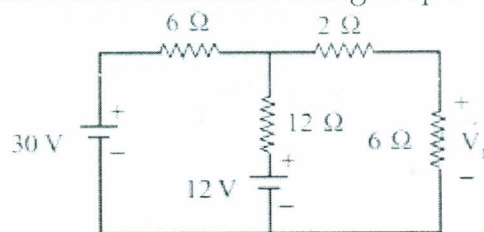
- i. State the basis for selecting the node voltage and mesh current techniques for circuit analysis.
- ii. Define form factor and peak factor.
- iii. Distinguish between active and reactive power.
- iv. Explain why a junction between p-type and n-type materials creates a contact potential.

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 using loop analysis method.

05

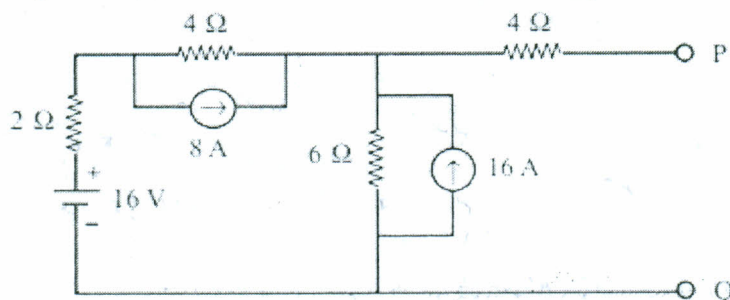


Q.4A State and explain superposition theorem. How is it applied for solving a network?

05

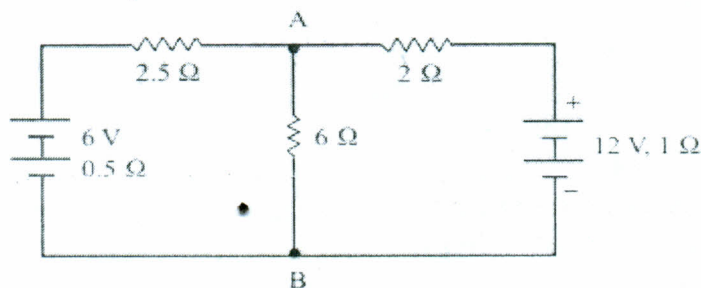
Q.4B Find Norton's equivalent circuit for the ckt shown in figure.

05



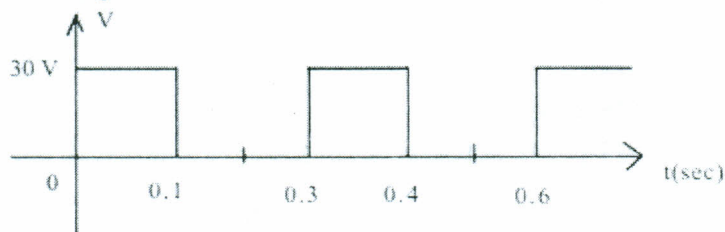
Q.5A Using superposition theorem, calculate the current in the AB branch in the circuit shown in below figure :

05



Q.5B Find rms value, average value and form factor of the wave.

05



Q.6A Explain the construction and working principle of a single phase transformer.

05

Q.6B A single phase transformer has 500 primary and 1000 secondary turns. The net cross sectional area of the core is 50 cm^2 . If the primary winding is connected to a 50 Hz supply at 400 V, calculate (a) the peak value of the flux density in the core and (b) the voltage induced in the secondary winding.

05

OR

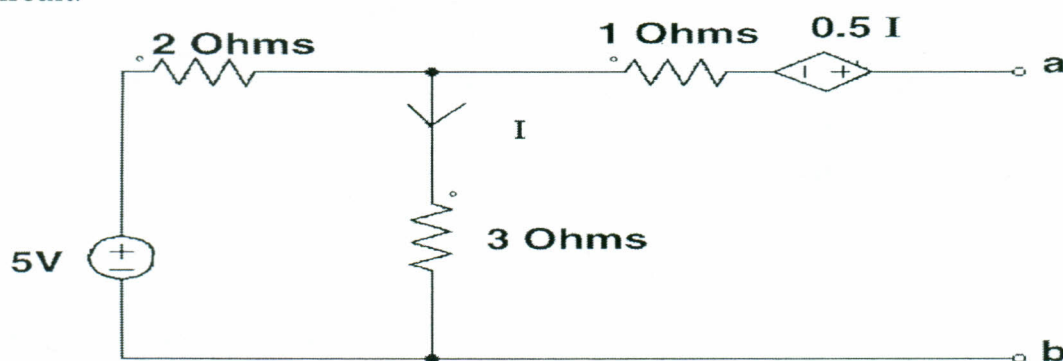
Q.6B A series RLC circuit consisting of a resistance of 20Ω , inductance 0.2 H and capacitance of $150 \mu\text{f}$ is connected across a 230 V, 50 Hz source. Calculate: (i) the impedance (ii) the current (iii) Power factor (iv) the frequency of supply to be adjusted to make power factor unity.

05

- Q.7A Distinguish between conductors, semiconductors and insulators. 05
 Q.7B Explain the working of a P-N junction diode when it is connected in (i) Forward bias and (ii) Reverse Bias. 05

OR

- Q.7B Describe in detail the working of an NPN bipolar junction transistor.. 05
 Q.8 Prove that in a 3-phase delta connected system $I_L = \sqrt{3} I_{ph}$. 10
 A 3-phase, 400 V supply is connected to a 3-phase star balanced load. The line current is 20 A and the power consumed by the load is 12 kW. Calculate the impedance of the load, phase current and power factor.
 Q.9A What are the various advantages of three phase system over a single phase system? Explain the method of power measurement in star connected 3-phase circuit by two wattmeter method? 10
 Q.9B Obtain Thevenin equivalent between the terminals a and b from the given circuit. 10



OR

- Q.9B Define the term resonance for an ac circuit consisting resistance, inductance and capacitance. Derive the condition of resonance in series RLC circuit. Also determine the current at resonance in a series RLC circuit having $R=10 \text{ Ohm}$, $L=0.1 \text{ H}$, and $C=8 \text{ microfarad}$. 10

