ESC132

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RAMAIAH Institute of Technology

(Autonomous Institute, Affiliated to VTU)
(Approved by AICTE, New Delhi & Govt. of Karnataka)
Accredited by NBA & NAAC with 'A+' Grade

SEMESTER END EXAMINATIONS – MAY 2023

Program : **B.E. - Common to all Programs** | **Semester** : **I**
Course Name : **Introduction to Electrical Engineering** | **Max. Marks** : **100**
Course Code : **ESC132** | **Duration** : **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT - I

1. a) With neat diagram, briefly explain the following methods of electric power generation i) Nuclear ii) Solar. CO1 (10)
   b) What is electrical load? Explain the loads based on type of utility. CO1 (10)

2. a) Draw single line representation of power system. Briefly explain its components. CO1 (10)
   b) With neat diagram, briefly explain the hydel electric power generation. CO1 (06)
   c) Define electrical grid. List the types of electrical grid. CO1 (04)

UNIT - II

3. a) Find the current through the 6Ω resistor connected across AB in Fig.3(a) using Thevenin's theorem. CO2 (08)

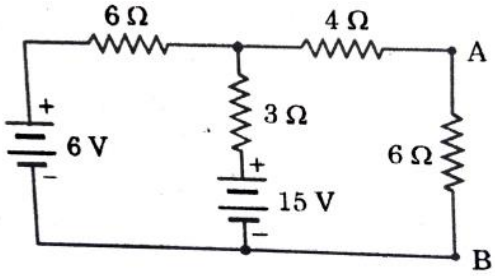

Fig. 3(a)

   b) Two batteries of A & B are connected in parallel to supply a load resistance of 6Ω. Draw the circuit arrangement. Calculate the current supplied by each battery and the load if the emfs. of A & B are 40 & 44 respectively. The internal resistance of A being 2Ω and that of B is 4Ω. CO2 (08)
   c) State KVL and KCL. CO2 (04)

4. a) State and explain: CO2 (10)
   (i)maximum power transfer theorem (ii) super position theorem.
   b) Find the current through the resistor R=20Ω for the circuit shown in Fig. 4(b) using superposition theorem. CO2 (10)

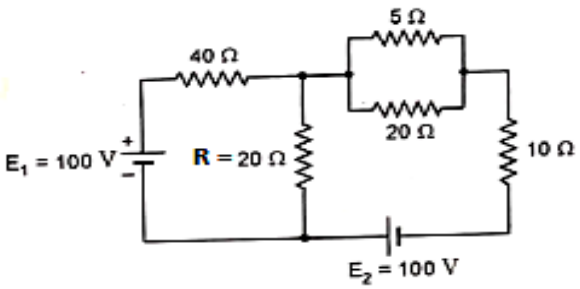

Fig.4(b)

UNIT - III

5.	a)	With a neat diagram, derive an expression for the relationship between voltage and current in a series RLC circuit for $X_L > X_C$ and obtain the expression for power. Draw the waveforms of voltage, current and power.	CO2	(08)
	b)	A resistance of 24Ω, an inductance of 0.16H and a capacitance of 150μF are connected in series across 240V, 50Hz supply. Determine (i) impedance (ii) current (iii) voltage across R, L and C (iv) power in Watts and VA (v) power factor and angle of lag.	CO2	(08)
	c)	Define peak factor and form factor of sinusoidal quantities.	CO2	(04)
6.	a)	Two impedances $20\angle 45^0\Omega$and $30\angle 30^0\Omega$ are connected in series across a certain supply and the resulting current is found to be 10A. If the supply voltage remains unchanged, calculate the supply current when theimpedances are connected in parallel.	CO2	(08)
	b)	Define active, reactive and apparent power in an AC circuit indicating their units. An inductive circuit draws 10A and 1kW from a 200V, 50Hz supply. Determine the (i) the impedance of the circuit in rectangular form (a+jb) (ii) impedance in polar form($Z\angle\theta$) (iii) the power factor (iv) the reactive power and (v) the apparent power.	CO2	(08)
	c)	Draw the impedance triangle of RL series circuit and hence deduce the expression for active, reactive and apparent powers.	CO2	(04)

UNIT- IV

7.	a)	Explain the working principle of a transformer.	CO3	(06)
	b)	Define slip of an induction motor. A three phase induction motor has 2 poles and is connected to a 50Hz, 400V system. Calculate the actual rotor speed and rotor frequency when the slip is 4%.	CO3	(08)
	c)	Explain the construction of squirrel cage rotor with necessary diagram.	CO3	(06)
8.	a)	Explain the concept of rotating magnetic field with relevant phasor diagram.	CO3	(08)
	b)	List out any three advantages of 3 phase AC.	CO1	(06)
	c)	A single phase 25kVA, 2000/200 V has iron and copper losses of 350W and 400W respectively. Calculate the efficiency at 0.8 power factor lagging.	CO3	(06)

UNIT - V

9.	a)	What is miniature circuit breaker? List any two merits and demerits of it.	CO5	(06)
	b)	What is two-way switch? Explain the working of it with neat sketch.	CO4	(08)
	c)	Define two-part tariff. Discuss how two-part tariff imposed to calculate electricity bills of domestic consumers.	CO4	(06)
10.	a)	List any six safety precautions while working with electricity.	CO5	(06)
	b)	What is earthing? Explain the necessity of it.	CO5	(08)
	c)	Discuss the difference between earthing and grounding.	CO5	(06)

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