

(Following paper code and roll No. to be filled in your answer book)

Paper ID : 199215

Roll No.

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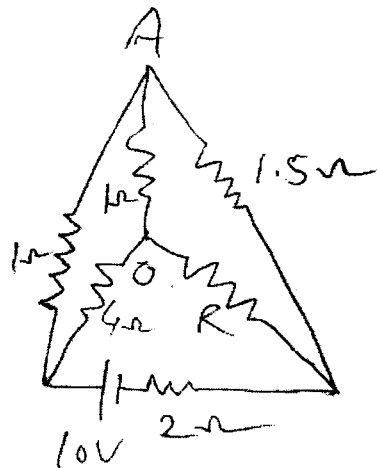
B. Tech.
(II SEM.) CARRY OVER EXAMINATION, 2014-15
ELECTRICAL ENGINEERING

TIME : 3 hrs**Max.Marks.:100**

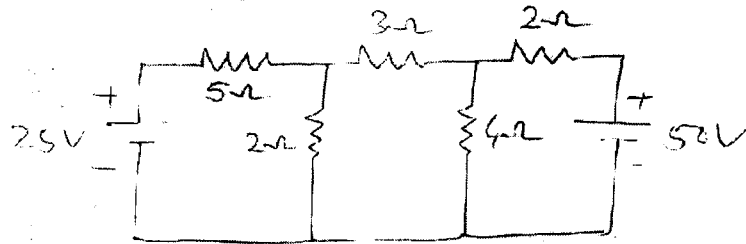
- Note:** (1) Attempt *all* questions.
(2) Each question carry equal marks.

1. Attempt any four parts:**(4×5=20)**

- a. Explain active and passive elements and also unilateral and bilateral elements.
- b. The equation of an A.C. is given as $i = 42.42\sin 628t$. Determine
 - i. Peak value
 - ii. Frequency
 - iii. Rms value
 - iv. Average value
 - v. Form factor
- c. Explain parallel resonance and show the current variation with frequency.
- d. Explain the following terms:
 - i. MMF
 - ii. Flux density
 - iii. Reluctance
 - iv. Relative permeability
 - v. Hysteresis
- e. Find the value of R and the current flowing through it in following network, when the current in branch OA is zero.

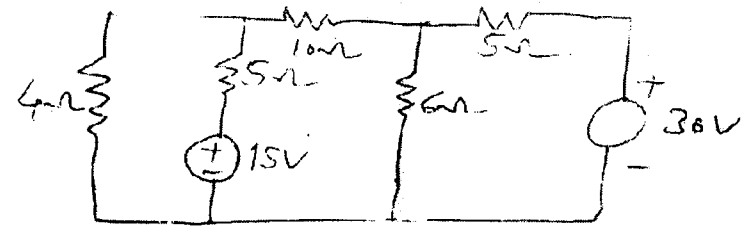


f. Using mesh analysis find the branch current in following network:



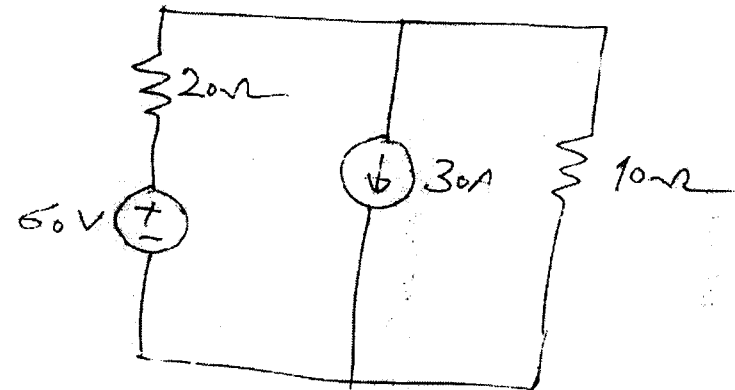
2. Answer any four parts of the following: (4×5=20)

- Find the impedance and the power factor of a circuit whose input voltage and current is given by $v = 100\sin\pi t$ and $i = 8\sin(100\pi t + 60^\circ)$.
- State and prove maximum power transfer theorem.
- Show that in a 3-phase star connected system, the line voltage is $\sqrt{3}$ times of the phase voltage.
- A dc shunt motor develops an open-circuit emf of 250 volt at 1500 rpm. Find its developed torque for an armature current of 20A.
- Describe the construction of a 1-phase induction energy meter with neat diagram.
- Using nodal analysis, find the current through 10Ω resistor in following network:



3. Attempt any two parts: (10×2=20)

- Derive an emf equation of power transformation. Also draw an equivalent circuit of it.
- Explain principle of operation and slip torque characteristics of a 3-phase induction motor.
- Find the current flowing through 10Ω resistance in the following circuit using superposition theorem.



4. Answer any two parts of the following: (10×2=20)

- Explain the following:
 - Similarities and dissimilarities between magnetic circuit and electric circuit.
 - A coil of 300 turns and 10Ω is wound uniformly over a steel ring of mean circumference of 30 cm and cross section area 9 cm². It is connected to a supply of 20V dc. If the relative permeability of the ring is 1500 find (i) the magnetising force, (ii) the reluctance, (iii) the mmf and (iv) the flux.

- b. Discuss the classification of power system in terms of voltage level. Also draw line diagram of typical substation.
- c. Explain the two watt-meter method to determine power in 3- ϕ system.

5. Attempt any two parts:

(10 \times 2=20)

- a. Explain the principle of AC synchronous generator. What are the advantages of rotating field over stationary armature? Give the applications of synchronous motor.
- b. Explain principle of operation and starting methods of 1- ϕ induction motor.
- c. A 4 pole, lap wound armature has 144 slots with two coil sides per slot, each coil having two turns. If the flux per pole is 20mWb and armature rotation at 720 rpm, what is the induced voltage?