

**B.TECH. SEM -I (CIVIL/ ELECTRICAL/ MECHANICAL/
PRODUCTION/ COMPUTER/ INFO. TECH. 2014 COURSE
(CBCS) : SUMMER - 2018**

SUBJECT : FUNDAMENTALS OF ELECTRICAL ENGINEERING

Day : **Friday**
Date : **25/05/2018**

S-2018-2210

Time : **10.00 AM TO 01.00 PM**
Max. Marks : **60**

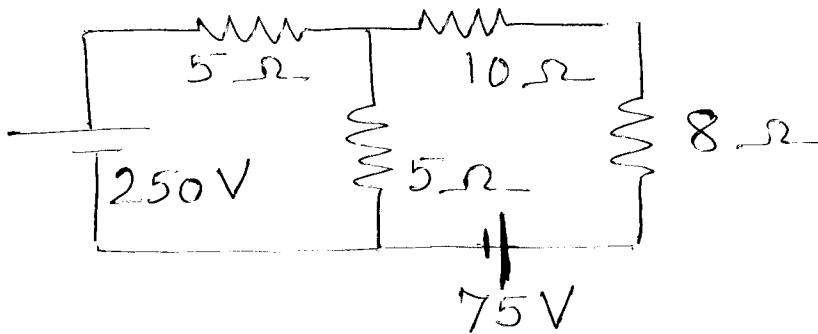
N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of calculator is **ALLOWED**.

- Q.1**
- a) A piece of silver wire has a resistance of 3Ω . What will be resistance of a manganin wire for one-third the length and one-third the diameter that of silver? The resistivity of manganin is 30 times that of silver. **(06)**
 - b) A coil has resistance of 25Ω at 27°C and increases to 48Ω when the temperature is raised to 58°C . Find the temperature of the coil when resistance becomes 72Ω . **(04)**

OR

- a) Find the current drawn by a crane motor when raising mass of 1000 kg through a height of 15m meters in 10 sec. The supply is 400 V DC, gear efficiency is 0.6 and motor efficiency is 0.8. **(04)**
 - b) Explain the effect of temperature on conducting, insulating and alloy material. **(06)**
- Q.2**
- a) Calculate current flowing through 5Ω , using Thevenins theorem. **(06)**

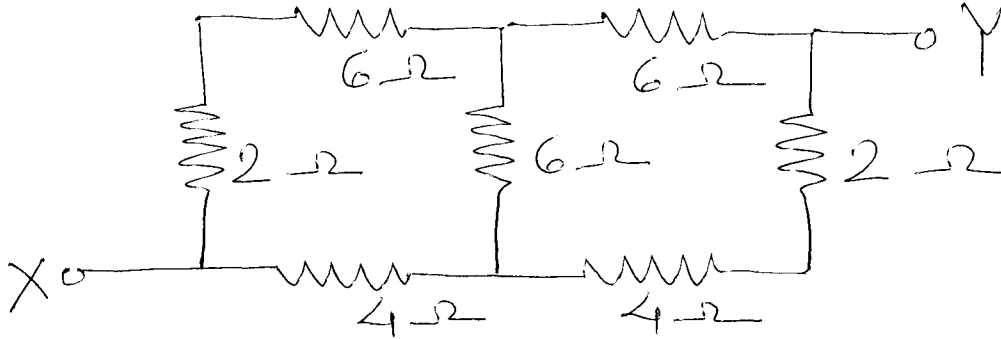


- b) State and explain superposition theorem. **(04)**

P.T.O.

OR

- a) State and explain maximum power transfer theorem. (04)
- b) Calculate the resistance between terminals X and Y. (06)



- Q.3 a) A $2 \mu\text{F}$ capacitor is connected across 100 volts through $1 \text{ M}\Omega$ series resistor by closing a switch. Calculate i) time constant ii) initial charging current iii) time taken for the capacitor voltage to reach 60 volt iv) voltage across capacitor 6 seconds after switch has been closed. (06)
- b) Derive the expression for energy stored in capacitor. (04)

OR

- Q.3 a) Define the following terms and state their units: (05)
- Electric flux density
 - Electric field strength
 - Dielectric strength
 - Permittivity
 - Breakdown voltage
- b) Explain construction and working of Ni-Cd battery. (05)
- Q.4 a) A iron ring of mean circumference of 50 cm has an air gap of 2 mm cut in it. It has circular cross section with area of 5 cm^2 . It carries a coil wound with 600 turns. The relative permeability of iron is 580. If the coil carries a current of 2 amp. Find the flux in the air gap. (06)
- b) Derive an emf equation of single phase transformer. (04)

OR

- a) A 25 KVA, 2200/220V, 50 Hz, single phase transformer has a primary resistance of 1.8Ω and a secondary resistance of 0.02Ω . Calculate the transformer efficiency at half load 0.8 lagging p.f. The iron losses are 1000 watt. (06)
- b) Explain the concept of dynamically induced emf. (04)

P.T.O.

- Q.5** a) If $v = V_m \sin \omega t$ is applied across single phase circuit, obtain expression for current flowing through the R-C circuit. Also derive the expression for average power consumed. Draw voltage, current and power waveforms. (06)
- b) Define the following terms i) Amplitude ii) Time period iii) Frequency (04)
iv) Instantaneous value.

OR

- a) Two circuits, the impedance of which are given by $Z_1 = (10 + j 15) \Omega$ and $Z_2 = (6 - j8) \Omega$ are connected in parallel across on A.C. supply. If the total current supplied is 15 Amp, what are the branch current drawn by two circuits. (05)
- b) State relation between line values and phase values in case of three phase star and delta connected load. (05)
- Q.6** a) Compare sodium and mercury vapour lamp. (05)
- b) With neat diagram, explain godown wiring. (05)

OR

- a) With neat diagram, explain concept of pipe earthing. (05)
- b) Write a short note on current MSEDCL residential electricity bill. (05)

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