

May- June 2012

[4161] – 104



Seat
No.

--



F.E. (Semester – I) Examination, 2012
BASIC ELECTRICAL ENGINEERING
(2008 Pattern)

Time : 3 Hours

Max. Marks : 100

- Instructions :**
- 1) Answer **3** questions from Section I and **3** questions from Section II.
 - 2) Answers to the **two** Sections should be written in **separate** books.
 - 3) Neat diagrams must be drawn wherever necessary.
 - 4) Black figures to the right indicate full marks.
 - 5) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

SECTION – I

- Q1. A) Field coil of a DC motor takes a current of 1.6 A from 400 V supply, after running for several hours. If temperature rise is 40°C, what value of extra resistance is required in the field circuit to maintain a field current equal to 1.6A ? Assume that motor is started from cold at 20°C and $\alpha_{20} = 0.0043 / ^\circ\text{C}$. 6
- B) Explain lead acid battery with respect to construction and maintenance. 6
- C) Explain following terms with respect to electrical. 4
- i) Energy ii) Power

OR

P.T.O.



Q2. A) How long it takes to raise the temperature of 880 gm of water from 16°C to boiling point ? The heater takes 2A at 220V supply and has an efficiency of 90%. Assume the specific heat of water to be 4190 J/kgK and 1 liter of water to have a mass of 1 kg.

6

B) Derive expression for insulation resistance of a single core cable.

6

C) Define temperature coefficient of resistance and state its unit.

4

Q3. A) State and explain following laws. (i) KVL (ii) maximum power transfer theorem.

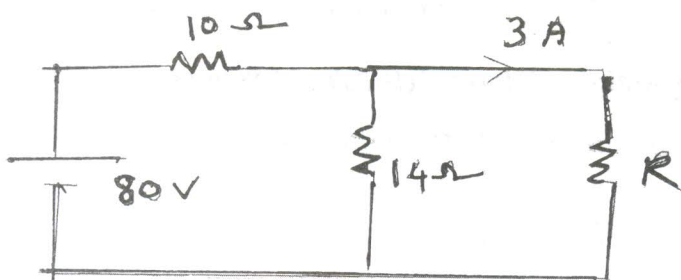
6

B) Derive an expression to convert star connected network in to its equivalent delta connected network.

6

C) Find value of R using KCL and KVL.

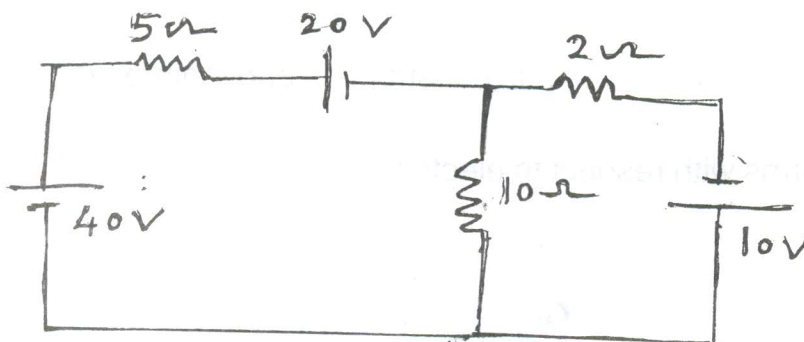
4



OR

Q4. A) Find current in 2-ohm resistance by using superposition theorem.

6





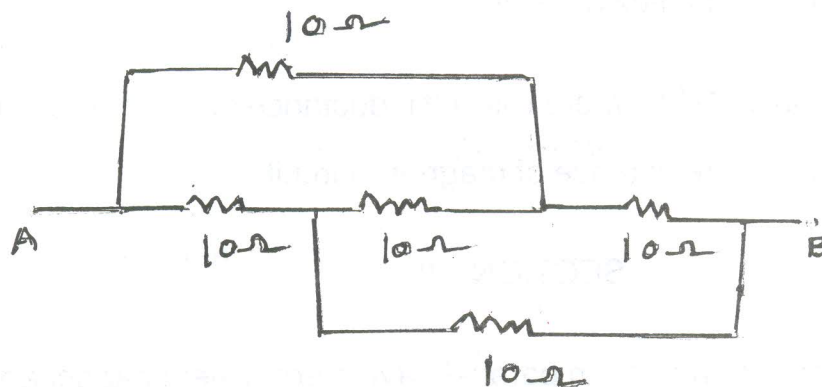
B) Explain following terms.

6

- i) Linear and non linear networks.
- ii) Active and passive networks.
- iii) Unilateral and bilateral networks.

C) Find equivalent resistance between A and B (All values in ohm).

4



Q5. A) Define following terms and state its unit.

6

- i) Magnetic flux
- ii) Flux density
- iii) Permeability of free space.

B) A coil of 450 turns is uniformly wound around a ring of an iron alloy of mean circumference of 100 cm and cross sectional area 1.125 cm^2 . When a current of 0.5A is linearly reduced to zero in 0.01 sec, the emf induced in coil is 2V. Find relative permeability of the iron alloy and the inductance of coil.

6

C) Write any four applications of magnetic circuit and draw series magnetic circuit.

6

OR

