SCHEME – E

Sample Question Paper

Course Name : Electronics Engineering Group

Course Code : ET/EJ/IE/IS/EN/EX/IC/DE/IU/MU/ED/EI/EV.

Semester : Third

Subject Title : Electrical Engineering **12068**

Max Marks : 100 **Time: 3 Hrs**

Instructions:

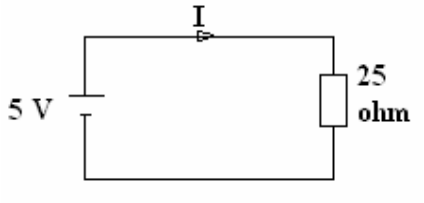
1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

Q1. Attempt any TEN of the following. **10x2=20**

a) Define resistance and state its unit.

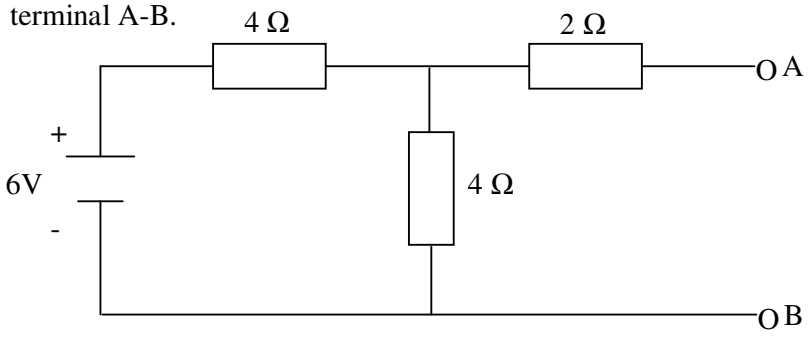
b) State Kirchhoff's current law.

c) In the given circuit calculate I?



d) Define unilateral and bilateral networks.

e) Obtain Thevenin's equivalent resistance for the network shown in below figure at the terminal A-B.



f) Define time period.

g) Draw a neat diagram of impedance triangle for inductive circuit.

h) Define RMS value of an alternating current /voltage.

i) What is the relationship between line and phase values of voltage and current for a balanced star connected system?

j) Name any four parts of DC motor.

k) Draw a sketch of torque-speed characteristics of three phase induction motor and label the axis.

l) State the method of changing the direction of rotation of universal motor.

Q2. Attempt any FOUR of the following. 4x4=16

a) Define ideal and practical voltage source. Draw their symbolic representation.

b) Describe the procedure used for solving electrical circuit problems using Superposition theorem. Illustrate your answer with the help of suitable circuit.

c) Give the procedure for constructing dual network of a given network.

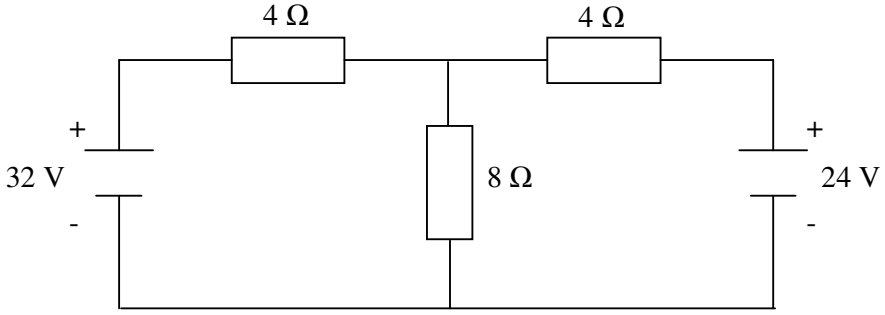
d) State any four advantages of three phase supply system over single phase system.

e) Draw the waveform and phasor diagram for current and voltage when AC flows through a pure inductive circuit. Also give the equations for voltage and current.

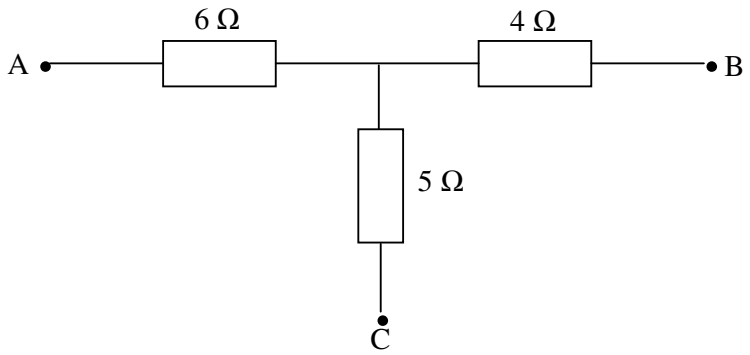
f) A coil having 20 ohm resistance and 0.2 H inductance is connected across 230 V, 50Hz A.C supply. Calculate i) Impedance
ii) Current
iii) Power factor and
iv) Power absorbed by the coil.

Q3. Attempt any FOUR of the following. 4x4=16

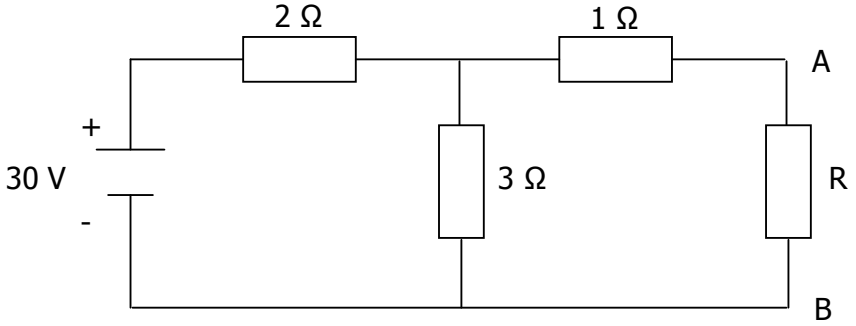
a) Find the current in the 8 ohm resistor in the circuit shown in below figure using Maxwell's loop analysis method.



b) Convert the star connection shown in below figure into its equivalent delta.



c) Calculate the value of load resistance R in the branch A-B, so that maximum power is transferred to the load of the circuit shown in below figure.



d) Define the term Power factor and its significance.

e) The voltage and current equations in an AC circuit are given by,

v =150sin (wt)

i = 3sin (wt + Л /2)

Find the RMS value of current and voltage. Also state the type of circuit and the power factor of the circuit.

f) A voltage wave is expressed by an equation e =200sin 314t. Find the frequency and RMS value of the voltage.

Q4. Attempt any FOUR of the following. 4x4=16

a) Draw the dual of the network given in figure no. 5.

b) Using Norton's theorem, find the constant current equivalent of the circuit shown in figure no. 6.

c) A resistance of 10 ohm and capacitance of 70μF are connected in series across 220V, 50Hz A.C supply. Calculate the current taken and power factor of the circuit.

d) Three resistances of 20 ohm each are connected in delta across a three phase, 400V, A.C supply. Find,

i) Phase current,

ii) Line current,

iii) Phase voltage,

iv) Total power consumed.

e) Write equations for active, reactive and apparent power for three phase circuit and give meaning of each term.

f) List the factors considered for selection of audio frequency, radio frequency and intermediate frequency transformer.

Q5. Attempt any FOUR of the following. 4x4=16

a) Describe the term transformation ratio, state its formula.

b) Why should a transformer be never connected to DC supply?

c) Draw the schematic diagram of DC shunt and series motor and give their one application.

d) Compare three phase squirrel cage induction motor and slip ring induction motor based on cost, starting torque, maintenance cost and starting method.

e) Draw a circuit diagram representing single phase AC servo motor and state its principle of working.

f) A 200V shunt motor runs at its normal speed of 300 rpm when the armature current is 100A. The resistance of armature is 0.12 ohm. Calculate the speed when a resistance is inserted in the field reducing the shunt field of 80 % of normal value and the armature current is 50A.

Q6. Attempt any FOUR of the following. 4x4=16

a) Draw a neat sketch of three phase induction motor showing its construction. Label the components.

b) Define back EMF and explain its significance in case of DC motor.

c) Draw the diagrams indicating reversal of rotation of three phase induction motor.

d) "Single phase induction motors do not have starting torque." Justify.

e) A single phase 10KVA, 230V/115V, transformer is fully loaded.
Find-
   i) Primary full load current,
   ii) Secondary full load current.

g) Give any one application of following motors-
   i) Single phase induction motor,
   ii) Universal motor,
   iii) Stepper motor,
   iv) A.C servo motor.

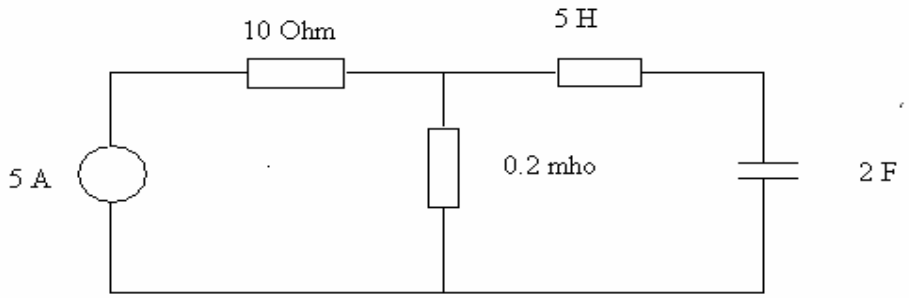


Figure no 5(Q4.a)

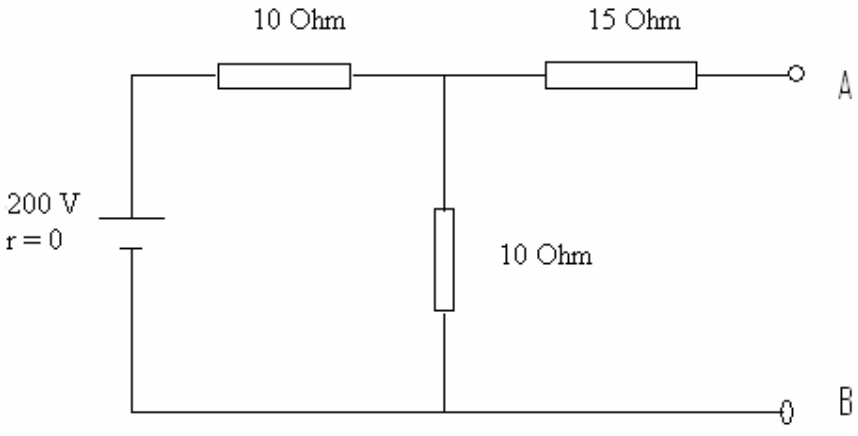


Figure no6(Q4.b)