17214

11718

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : *(1)* ***All*** *questions are* ***compulsory****.*
(2) Answer ***each*** *next main question on a* ***new*** *page.*
(3) Illustrate your answers with neat sketches ***wherever*** *necessary.*
(4) Figures to the ***right*** *indicate* ***full*** *marks.*
(5) ***Assume*** *suitable data,* ***if necessary****.*
(6) ***Use*** *of Non-Programmable Electronic Pocket* ***Calculator*** *is* ***permissible****.*
(7) Mobile Phone, Pager and ***any*** *other Electronic Communication devices are* ***not*** *permissible in* ***Examination Hall****.*
(8) ***Use*** *of steam tables, logarithmic, Mollier's chart is* ***permitted****.*

Marks

1. Attempt **any ten** of the following : **20**

a) Define :
   i) Ampere ii) Volt.

b) Write definition of "Branch" and "Node" related to electric circuit.

c) Define conductance and state its unit.

d) Explain the following terms :
   i) Unilateral circuit ii) Non-linear circuit.

e) What do you understand by the term capacitance ? What is its unit ?

f) Define permeability. What is the value of permeability of free space ?

g) What is permanent magnet and electromagnet ?

h) Define co-efficient of coupling.

i) What are insulating material ?

j) State two types of inductors and give their applications.

k) State any four properties of conducting materials.

l) Define the following terms :
   i) Reluctance ii) MMF.

Marks

2. Attempt **any four** of the following : **16**

a) How to convert practical current source into practical voltage source ? Draw equivalent voltage source for given circuit shown in Fig. 1.

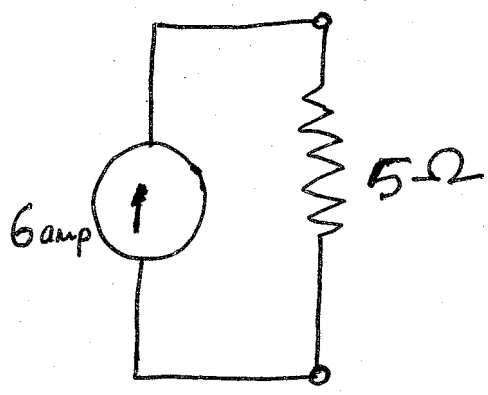

Fig. 1

b) A silver coil has a resistance of 3.7 Ω at 42°C and 4.2 Ω at 100°C. Find the resistance at 0°C and the temperature-coefficient of resistance at 40°C.

c) Derive equivalent resistance for series and parallel circuit containing three resistance.

d) State and explain Kirchoff's voltage law with suitable example.

e) Find current through 5 Ω resistance using Kirchoff's law of Fig. 2.

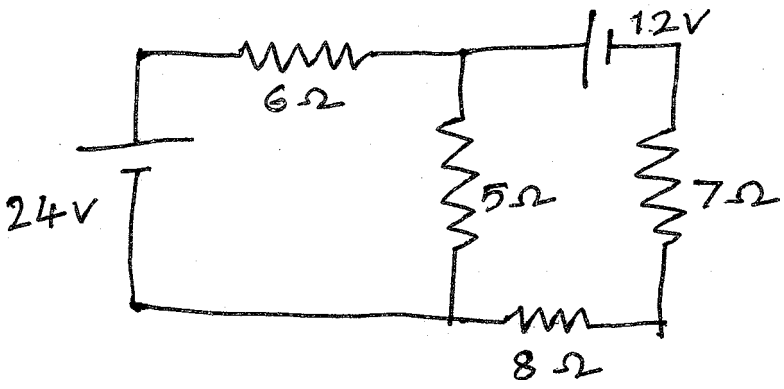

Fig. 2

f) State Faraday's law of Electromagnetic Induction and explain.

Marks

3. Attempt **any four** of the following : **16**

a) Explain briefly the factors affecting the capacitance of capacitor.

b) State the equation :

i) Voltage across capacitor while charging and discharging.

ii) Current in capacitor while charging and discharging.

c) Find the value of capacitance, charge and energy stored if plate area is 500 cm^2 and thickness of insulation is 1.6 mm, capacitor is connected across 120 volt.

d) Calculate the value of equivalent capacitance of the Fig. 3.

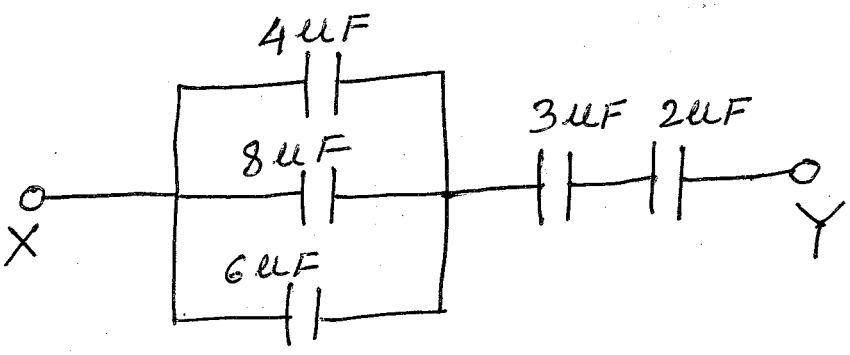

Fig. 3

e) Draw hysteresis loop. Explain how it is plotted.

f) Explain briefly the various electric characteristics of battery.

4. Attempt **any four** of the following : **16**

a) Explain Ohm's Law for magnetic circuit.

b) Describe the concept of leakage flux, useful flux and fringing with neat diagram.

c) An iron ring of 20 cm in diameter, 10 cm^2 in cross sectional area is wound with 250 turns for the flux density of 1.2 wb/m^2 and permeability of 600, find.

i) Reluctance

ii) Flux

iii) MMF

iv) Current for excitation.

d) Three resistance are connected in star their values are 8 Ω , 10 Ω and 6 Ω . Determine its equivalent delta circuit.

e) Explain following terms :

i) Flux density

ii) Magnetic field strength.

State the relation between the two terms.

f) Classify the magnetic materials and explain in brief.

Marks

5. Attempt **any four** of the following : **16**

a) Explain in brief the concept of statically induced and dynamically induced emf. Give eg. of each.

b) Explain Fleming's Right hand rule and Lenz's law.

c) State and explain in short the factors affecting the self inductance of a coil.

d) The field winding of D.C. generator is wound with 910 turns and has resistance of 30 Ω . When the voltage is 125 volts, the magnetic flux linking the coil is 0.007 wb. Calculate the self inductance of the coil and the energy stored in the magnetic field.

e) State the various effects of electric current and explain any one.

f) With a neat circuit, show the current division in two parallel resistance, R_1 and R_2 in terms of total current.

6. Attempt **any four** of the following : **16**

a) What are the different methods of charging batteries ? Draw a neat circuit diagram of any one and explain.

b) Explain the maintenance of lead acid battery.

c) Draw the graphical representation of alternating E.M.F or current. Show the following parameters in the same.

i) Cycle

ii) Time period

iii) Amplitude.

d) Compare copper and aluminium.

e) Explain the mechanical properties of insulating materials.

f) Two resistors are connected in parallel $R_1 = 20\,\Omega$ and $R_2 = 30\,\Omega$ the voltage is 25 volt. Calculate the current that flows through each resistor and total current draw by the circuit.