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3 Hours / 70 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.

Marks

1. Attempt any FIVE of the following : **10**

a) Define Ohm's Law and state its equation.

b) State Lenz's Law.

c) Write the equation of Energy stored in Capacitor.

d) Define "MMF" and state its unit.

e) If two resistances 3 Ω and 5 Ω are in series, calculate their equivalent resistance.

f) State "Fleming's Right Hand Rule".

g) State any two types of inductors.

P.T.O.

Marks

2. Attempt any THREE of the following : **12**

a) Derive the equation of energy stored in a capacitor.

b) Define "Resistance" and "Resistivity" and state their units.

c) Three capacitors having capacitances of 4 μF, 5 μF and 10 μF. Find total capacitance when they are connected in –

i) Series

ii) Parallel

d) Draw the symbol and characteristics of Ideal Voltage Source and Practical Voltage Source.

3. Attempt any THREE of the following : **12**

a) Define the following :

i) Magnetic Lines of Force

ii) Flux

iii) Flux Density

iv) Magnetic Flux intensity.

b) State any four types of Inductors and state their applications.

c) Derive an equation for capacitance of parallel plate capacitor.

d) Find the current (I) flowing through 8Ω resistor shown in Figure No. 1 using Kirchhoff's Voltage Law.

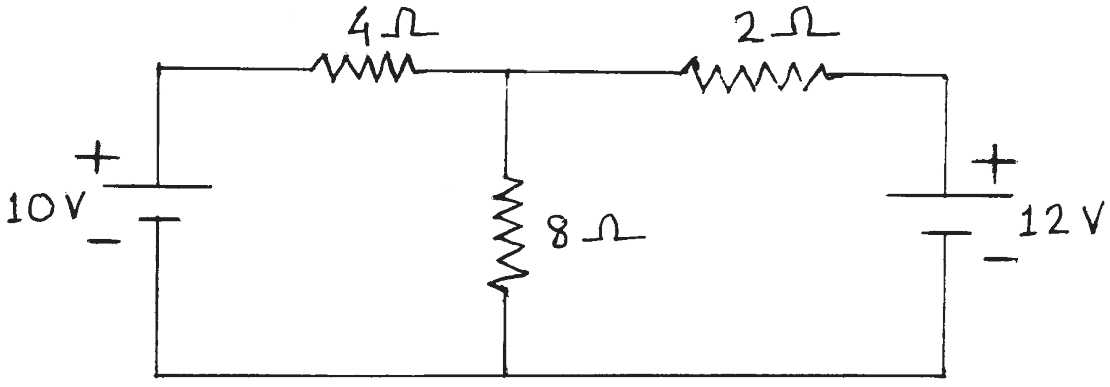

Fig. No. 1

Marks

4. Attempt any THREE of the following : **12**

a) Describe the effect of temperature on Resistance.

b) Draw hysteresis loop for hard steel, cast steel and sheet steel, also write applications for each material.

c) Derive the equation for Energy stored in Magnetic Field.

d) Compare between Electric and Magnetic Circuits.
(Any four points)

e) State different types of effects of electric current and explain any one.

5. Attempt any TWO of the following : **12**

a) Calculate the equivalent resistance between terminal A and B shown in Figure No. 2.

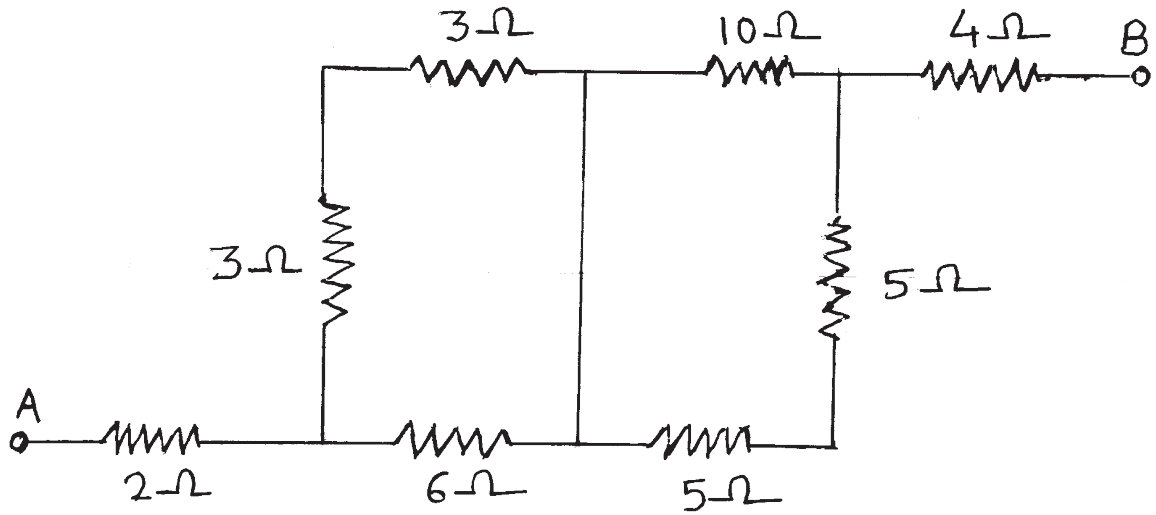

Fig. No. 2

b) An iron ring of mean circumference of 70 cm and cross sectional area of 50 mm^2 is uniformly wound by wire of 1000 turns carrying 1.6 A current. Calculate the value of flux and flux density. (Assume μ_r = 1000).
Also calculate mmf and field intensity.

Marks

c) Define the following terms :

i) Active and Passive Network

ii) Linear and Non-Linear Circuit

iii) Unilateral and Bilateral Circuit

6. Attempt any TWO of the following : **12**

a) Derive the equation of Coefficient of Coupling in Magnetic Circuits.

b) State and explain Breakdown Voltage and Di-electric strength of capacitor. Also state the factors affecting Breakdown Voltage.

c) Draw a neat sketch of series magnetic circuit. State value of reluctance (S) for both series and parallel magnetic circuit. Name each term used in them.
