TED (15) – 2031 Reg. No. .....

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SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS ENGINEERING — MARCH, 2016

BASIC ELECTRICAL ENGINEERING

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. Define temperature co-efficient of resistance.
2. Four 1Ω resistances are connected in parallel. What is the equivalent resistance ?
3. If charge Q = 144 μC and capacitance C = 6 μF, find voltage V.
4. Define reluctance and state its unit.
5. Write the units of magnetic flux and mmf. (5×2 = 10)

PART— B

(Maximum marks : 30)

II Answer *any five* questions from the following. Each question carries 6 marks.

1. A heater wire of length 50cm and 1mm^2 in cross-section carries a current of 2A when connected across a 2V battery. What is the resistivity of the wire ?
2. Draw a DC network and write mesh equations applying Kirchhoff's voltage law.
3. A current of 20A goes through two ammeters A and B connected in series. The p.d across A is 0.2V and across B is 0.3V. Find how the same current will divide between A and B when they are connected in parallel ?
4. State and explain reciprocity theorem.
5. State and explain the laws of electrostatics.
6. State Faradays laws of electromagnetic induction.
7. Draw B-H curve and mark the various regions in the graph.

(5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT – I

III (a) State Ohm's law. 3

(b) Draw atomic structure of copper atom. Atomic number = 29, atomic weight = 64. 3

(c) A wheatstone bridge circuit has $R_{AB} = 60\Omega = R_{CD}$, $R_{BC} = R_{AD} = 40\Omega$, $R_{BD} = 100\Omega$. Supply is connected to points A and C. If the current drawn from the supply is 100mA, find the currents through R_{BC}, R_{CD} and R_{BD}. 9

OR

IV (a) Define electric power. Write the relationship between V, I, R and P. 3

(b) Calculate the energy spent for a 60W lamp working 8 hours day for one year. 3

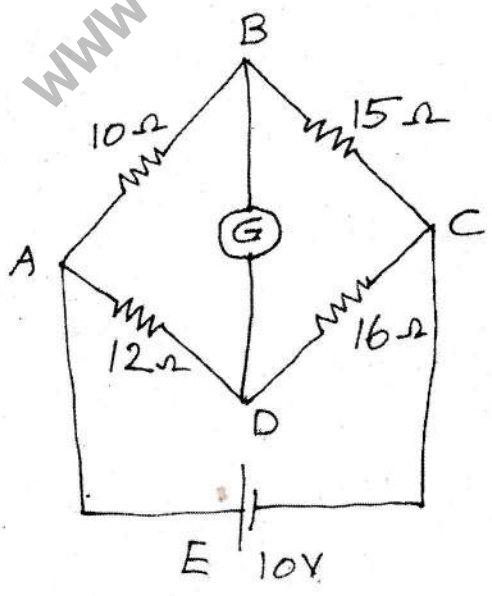
(c) Two conductors, one of copper and the other of iron, are connected in parallel and at 20°C carry equal currents. What proportion of current will pass through each, if the temperature is raised to100°C. Assume α for copper as 0.0042 and for iron as 0.006 per °C at 20°C. 9

UNIT – II

V (a) Write any three properties of series circuit. 3

(b) State super position theorem. 3

(c) The galvanometer in figure below has a resistnce of 5Ω. Find the current through the Galvanometer using Thevinin's Theorem.



9

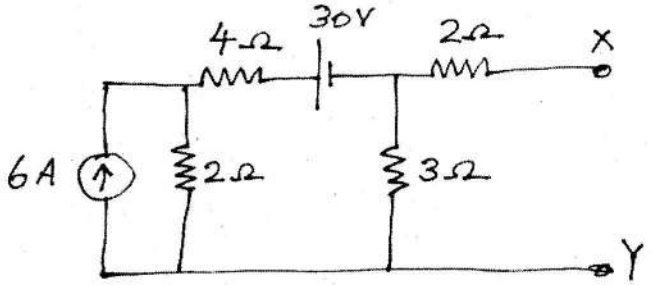
OR

Marks

VI (a) Write any three properties of parallel circuit. 3

(b) State max. power transfer theorem. 3

(c) Find Norton's equivalent for the network to the left of terminals X-Y in figure shown below.



9

UNIT – III

VII (a) What is meant by dielectric strength of a medium ? 3

(b) Relative permittivity of mica is 5. What is its absolute permittivity ? 3

(c) A 10 μF, 20 μF and a 40 μF capacitors are connected in series to a 399 volt source emf.

(i) What is the equivalent capacitance ?

(ii) What is the magnitude of charge across each capacitor ?

(iii) What is the potential difference across each capacitor ? 9

OR

VIII (a) Write any three applications of capacitors. 3

(b) Calculate the total capacitance, if three capacitors of capacitance 2 μF, 4 μF and 6 μF are connected in

(i) Series (ii) Parallel 3

(c) Derive the expression for energy stored in a capacitor. 9

UNIT – IV

IX (a) State Fleming's left hand rule. 3

(b) State Lenz's law. 3

(c) A mild steel ring having a cross-sectional area of 500mm^2 and a mean circumference of 400mm has a coil of 200 turns wound uniformly around it.

Calculate :

(i) The reluctance of the ring

(ii) The current required to produce a flux of 800 μWb in the ring.

Take relative permeability of mild steel as 400 at the given flux density. 9

OR

X (a) Define self inductance. 3

(b) State Fleming's right hand rule. 3

(c) Derive expression for self inductance and mutual inductance. 9

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