TED (15) – 2031

(REVISION – 2015)

Reg. No. .....

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SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS ENGINEERING — OCTOBER, 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.

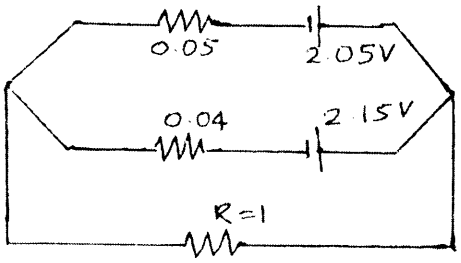
1. Define potential difference and write its unit.
2. Write equation for effective resistance of a parallel resistance combination.
3. Write equation for current in a load resistance by Thevenin's theorem.
4. Write two methods for changing capacitance of a parallel plate capacitor.
5. What is flux density ? (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Derive an equation to obtain the equivalent resistance of three resistance in
   (a) parallel (b) series
2. State and explain lows of resistance.
3. Explain the steps for finding Thevenin's Equivalent.
4. By using Super position theorem, find the current in resistance R.



5. What is meant by dielectric strength of a medium ?
6. What is difference between dynamically induced emf and statically induced emf ?
7. State and explain Faraday's laws of Electromagnetic induction. (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 and explain Kirchhoff's voltage and current law. 7

(b) The shunt winding of a motor has a resistance of 80Ω at 15°C. Find its resistance at 15°C, temperature co-efficient of copper is 0.004/°C. 8

OR

IV (a) Explain effect of temperature on resistance. 7

(b) In a residential house, the following loads are connected.

(i) 15w CFL — 6 nos. works 5 hours a day

(ii) 60w lamps — 4 nos. works 4 hours a day

(iii) 2000w induction heater — 30 mts a day

(iv) 360w refrigerator — 24 hours a day

If the electricity is 2.6/unit, what will be the monthly electricity charge. 8

UNIT – II

V (a) State and explain super position theorem. 7

(b) A resistance of 10Ω is connected in series with two resistances each of 15Ω arranged in parallel. What resistance must be shunted across this parallel combination so that the total current taken shall be 1.5A with 20V applied ? 8

OR

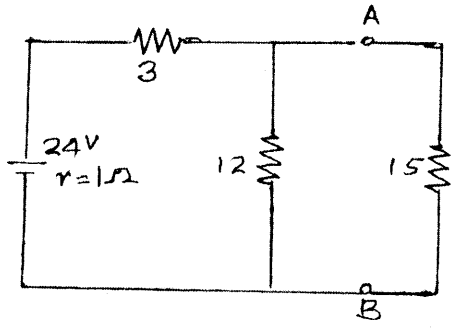
VI (a) State and explain Norton's theorem. 7

(b) With the reference to the network, by applying Thevenin's theorem find the following :

(i) The equivalent emf of the network when viewed from terminals A and B.

(ii) The equivalent resistance of the network when looked into from terminal A and B.

(iii) Current in the load resistance R_L of 15Ω



8

Marks

UNIT – III

VII (a) Derive the equation for equivalent capacitance when capacitors are connected in parallel and series. 7

(b) State and explain laws of Electrostatics. 8

OR

VIII (a) Derive expressions for parallel plate capacitor in a uniform dielectric medium. 7

(b) Three capacitors A, B and C have capacitance 10, 50 and 25μ respectively. Calculate :

(i) Charge on each when connected in parallel to a 250v supply

(ii) Total capacitance

(iii) Potential deference across each when connected in series. 8

UNIT – IV

IX (a) Explain absolute and relative permeability of a medium. 7

(b) A wooden ring has a circular cross-section of 300 sq.mm and a mean diameter of the ring is 200mm. It is uniformly wound with 800 turns. Calculate :

(i) The field strength produced in the coil by a current of 2A : (assume $\mu_r = 1$)

(ii) The magnetic flux density produced by this current

(iii) The current required to produce a flux density of 0,02 wb/m^2 8

OR

X (a) Derive expression for energy stored in an inductor. 7

(b) An iron ring of 20cm mean diameter having a cross-section of 100 cm^2 is wound with 400 turns of wire. Calculate the exciting current required to establish a flux density of 1 wb/m^2, if the relative permeability of iron is 1000. What is the value of energy stored ? 8