TED (15) – 2031

(REVISION — 2015)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

BASIC ELECTRICAL ENGINEERING

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. What is resistance of a substance ?
2. Define specific resistance of material.
3. State condition for maximum power transfer.
4. Define the break down voltage.
5. Define self-inductance.

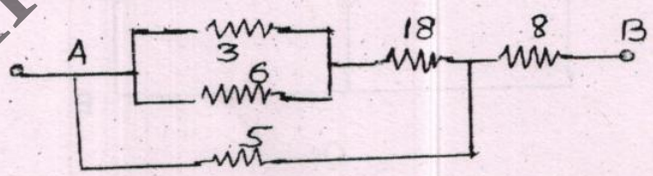
(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Calculate the effective resistance of the following combination of resistances and the voltage drop across each resistance when a P.D of 60v is applied between point A and B.



2. Explain effect of temperature on resistance.
3. State and explain Norton's theorem.
4. Derive condition for maximum power transfer in a network.
5. Calculate the effective capacitance of the capacitors c1, c2, c3 in (a) parallel (b) in series.
6. Derive an expression for energy stored in a capacitor.
7. State laws of magnetic force.

(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 Kirchhoff's laws. 7

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

(i) 60 w lamps	—	6 nos. 5 hrs. a day
(ii) 40 w lamps	—	4 nos. 4 hrs. a day
(iii) 1500 w heater	—	1 no. 2 hrs. a day
(iv) Refrigerator 746 w	—	8 hrs. a day

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

OR

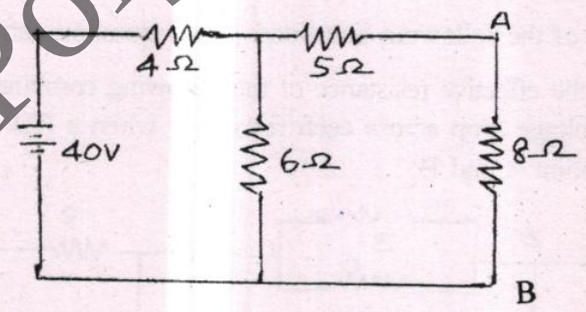
IV (a) Explain Electric Power. 7

(b) The filament of a 60-watt, 230 V lamp has normal working temperature of 2000°C. Find the current flowing in the filament at the instant of switching, when the lamp is cold. Assume the temperature of cold lamp to be 15°C and $\alpha_{15} = 0.005/°C$. 8

UNIT — II

V (a) Explain the steps for finding Thevenin's parameters. 7

(b) Using Norton's theorem, find the current in 8Ω resistance of the network shown.



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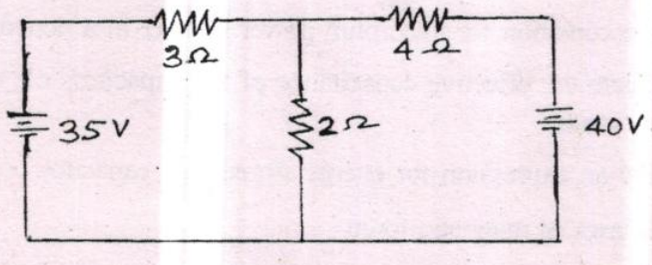
OR

VI (a) State and explain Maximum power transfer theorem. 7

(b) In the network shown, find the different branch current by super-position theorem.



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Marks

UNIT — III

VII (a) Illustrate the potential gradient. 7

(b) Three capacitors of capacitance 2μF, 4μF and 6μF respectively are connected in series to a 220 V dc. Supply. Find (i) the total capacitance (ii) charge on each capacitor and (iii) p.d. across each capacitor. 8

OR

VIII (a) Derive an expression for potential at point in (a) Air and (b) medium 7

(b) A parallel plate capacitor is charged to 50 μ.F at 150 V. It is then connected to another capacitor of capacitance 4 times of the first capacitor. Find the loss of energy. 8

UNIT — IV

IX (a) State Coulomb's law. 7

(b) A coil of 200 turns of wire is wound on a magnetic circuit of reluctance 2000AT/mWb. If a current of 1A flowing in the coil is reversed in 10 ms, find the average e.m.f. induced in the coil. 8

OR

X (a) Draw and Explain B-H curve. 7

(b) Compare magnetic circuit and electric circuit. 8