TED (10)–3004

(REVISION—2010)

Reg. No. .....

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SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS ENGINEERING—MARCH, 2013

BASIC ELECTRICAL ENGINEERING

[*Time* : 3 hours

(Maximum marks : 100)

Marks

PART—A

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

1. Define specific resistance of materials.
2. Define Kirchoff's voltage law.
3. Define the term break down voltage.
4. What is flux density ?
5. $A = 20\angle 60°$, $B = 5\angle 30°$. Find A×B and A/B. (5×2=10)

PART—B

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

1. State Superposition theorem.
2. Draw the B-H curve and explain the various regions of the curve.
3. Define :

   (i) RMS value (iii) Instantaneous value of an alternating quantity.

   (ii) Average value
4. What is resonance in RLC series circuits ? Derive the equation for resonance frequency.
5. Define :

   (i) Admittances (ii) Susceptences (iii) Conductances.
6. Derive an expression for the magnetising force of a long straight current carrying conductor.
7. Differentiate statically and dynamically induced emf. (5×6=30)

Marks

PART—C

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

UNIT—I

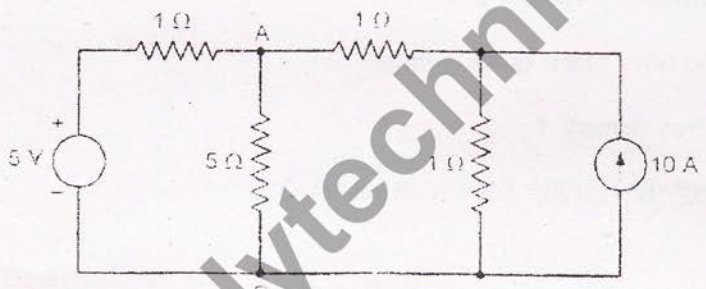
III (a) State Thevenin's theorem. 6

(b) A coil of relay made of copper wire. At a temperature of 20° C, the resistance of the coil is 400Ω. Calculate the resistance of the coil at temperature of 80° C. The temperature coefficient of copper is 0.0038Ω/Ω/°C at 0°C. 9

OR

IV (a) State maximum power transfer theorem. 6

(b) Find, using Thevenin's theorem, the current in the 5Ω resistor connected across AB in the network shown in figure.



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UNIT—II

V (a) Compare magnetic circuit and electric circuit with respect to their similarities. 6

(b) Two capacitors have capacitances of 6 μF and 10 μF respectively :

(i) Find the total capacitance when they are connected (a) in parallel (b) in series.

(ii) When the above two capacitance are connected in series across a 200V supply, find the potential difference across each capacitor and the charge on each capacitor. 9

OR

VI (a) Derive the expression for capacitance of an isolated sphere. 6

(b) A rectangular shaped core is made of mild steel plate 15mm × 20mm cross section.. The mean length of magnetic path is 18cm. The exciting coil has 300 turns and current 0.7A. Calculate:

(i) Magnetising force
(ii) Flux density
(iii) Reluctance
(iv) Flux of magnetic circuit. Assume relative permeability of mild steel as 940. 9

Marks

UNIT—III

VII (a) Define self inductance and mutual inductance. 8

(b) Two coils have a mutual inductance of 0.3H. If the current in one coil is varied from 5A to 2A in 0.4S, calculate the average emf induced in the second coil. 7

OR

VIII (a) Describe the phase and phase difference of alternating voltage and current. 6

(b) An alternating voltage as given by V = 141.4 sin 314t. Find :

(i) frequency (iii) average value

(ii) rms value (iv) the instantaneous value of voltage when t is 3ms. 9

UNIT—IV

IX (a) Explain RLC series circuit with wave form and phasor diagram. 6

(b) A non inductive resistance of 10Ω is connected in series with an inductive coil across 20V, 50Hz. AC supply. The current drawn by the series combination is 10A. The resistance of the coil is 2Ω. Determine :

(i) Inductance of the coil (ii) Power factor of the circuit. 9

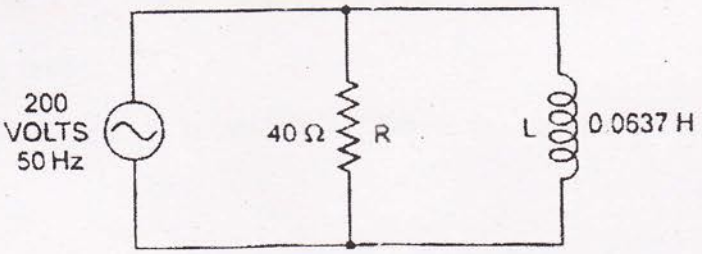
OR

X (a) Explain impedance and impedance triangle. 6

(b) The following diagram shows a parallel R-L arrangement connected across 200V, 50Hz AC supply. Calculate :

(i) the current drawn from the supply (iii) real power

(ii) apparent power (iv) reactive power.



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