TED (10) – 3004

(REVISION — 2010)

Reg. No.....

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

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. Define Temperature coefficient of resistance.
2. State the laws of Electrostatics.
3. Define dielectric strength.
4. State Lenz's law.
5. Given two vectors : A = $20\angle 60°$ and B = $5\angle 30°$. Find A × B and A/B. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Explain various steps involved in converting a network into a Norton equivalent circuit.
2. Derive the expression for capacitance of a group of capacitors when they are connected in (a) Series (b) Parallel.
3. Obtain the force produced by a current carrying conductor placed in magnetic field.
4. Define (a) Average value (b) R.M.S. value and (c) Form Factor of alternating quantities.
5. Determine energy stored in magnetic field.
6. Explain Rectangular form of phasors.
7. Define : (a) Apparent power (b) Reactive power (c) Active power. (5×6 = 30)

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Write short note on Kirchoff's voltage and current laws. 8

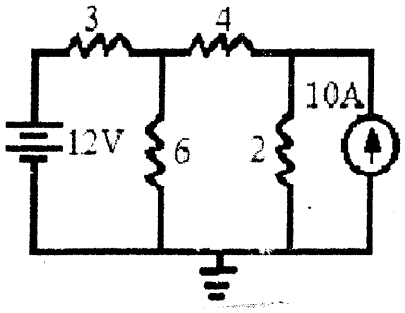
(b) Calculate the resistance of 1 km long cable composed of 19 strands of similar copper conductors, each strand being 1.32 mm in diameter. Resistivity of copper may be taken as 1.72×10^{-8} Ω-m. 7

OR

Marks

IV (a) Distinguish sign conventions for voltage drop and emf in a branch of a network. 7

(b) Using Thevenin theorem, calculate the current flowing through the 4Ω resistor.



8

UNIT — II

V (a) Compare electric circuit and magnetic circuit. 8

(b) Obtain an expression for potential at a point in the air. 7

OR

VI (a) Draw the B-H curve and explain various regions of the curve. 7

(b) Explain mmf, magnetic field strength and reluctance. 8

UNIT — III

VII (a) Obtain the formula for coefficient of coupling. 7

(b) The field winding of a DC electromagnet is wound with 960 turns and has a resistance of 50 Ω when the exciting voltage is 230 V, the magnetic flux linking the coil is 0.005Wb. Calculate the self-inductance of the coil and the energy stored in the magnetic field. 8

OR

VIII (a) Describe the phase and phase difference of alternating quantity. 7

(b) A flux of 0.5 mWb is produced by a coil of 900 turns wound on a ring with a current of 3 A in it. Calculate :

(i) Inductance of the coil.

(ii) e.m.f. induced in the coil when a current of 5A is switched off, assuming the current to fall to zero in 1 milli second.

(iii) Mutual inductance between the coils, if a second coil of 600 turns is uniformly wound over the first coil. 8

UNIT — IV

IX (a) Explain RL series circuits with wave form and phasor diagram. 7

(b) A choke coil takes a current of 2 A lagging 60° behind the applied voltage of 200 V at 50 Hz. Calculate the Inductance, Resistance and Impedance of the coil. 8

OR

X (a) Explain RC series circuits with wave form and phasor diagram. 7

(b) A resistance of 20 ohm, inductance of 0.2H and capacitance of 150 μF are connected in series and are fed by a 230 V, 50 Hz supply. Find

(i) Inductive reactance (ii) Impedance (iii) Reactive power (iv) Active power 8