

TED (10)–3004

(REVISION—2010)

Reg. No.

Signature

SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING—MARCH, 2012

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. Give name of two positive temperature co-efficient materials.
2. Give any two factors affecting capacitance of a parallel plate capacitor.
3. Define self inductance.
4. Give the minimum value of power factor in an electric circuit.
5. Give the disadvantage of maximum power transfer theorem. (5x2=10)

PART—B

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

1. Give the steps involved in converting an electrical circuit into a Norton's source.
2. Analyse the time constant of a capacitor.
3. Analyse the importance of mutual inductance in electrical engineering.
4. Analyse the effect of resonance in a RLC series circuit.
5. Perform the following operation and express the final result in the rectangular form : $(15 + j30) + 8 \angle -30^\circ$.
6. Prove that the energy stored in a magnetic field is $\frac{1}{2} CV^2$, where C is the capacitance and V is the circuit voltage.
7. Derive an expression for energy stored in a magnetic field. (5x6=30)

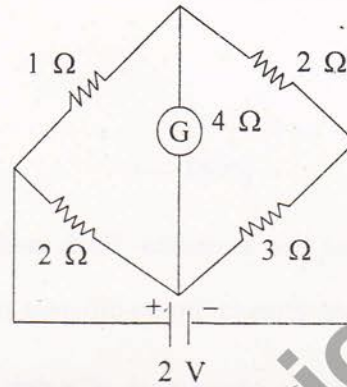
PART—C

Marks

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

UNIT – I

- III (a) Differentiate between ideal voltage source and practical voltage sources. 6
 (b) Calculate the current through the galvanometer shown in the figure below :



OR

- IV (a) State and explain superposition theorem. 6
 (b) An incandescent lamp is marked 250 V, 500 W. What current does it take if connected to the rated voltage? What is its hot resistance? How to limit this current to 1A. ? 9

UNIT – II

- V (a) Illustrate the potential of a charged sphere. 6
 (b) A laminated soft iron ring of relative permeability 1000 has a mean circumference of 800 mm and a cross sectional area 500 mm². A radial air gap of 1 mm width is cut in the ring which is wound with 100 turns. Calculate the current required to produce an airgap flux of 0.5 mWb if leakage factor is 1.2 and stacking factor is 0.9. 9

OR

- VI (a) Analyse the potential at a point in a electrostatic field. 6
 (b) Analyse the force exerted in current carrying conductor, when it is placed in a magnetic field. 9

UNIT – III

- VII (a) Analyse the emf generated in a single phase A C generator. 6
 (b) A sinusoidal varying alternating current of frequency 60 Hz has a maximum value of 15 A.
 (i) Write down the equation for instantaneous value.
 (ii) Find the value of current after 1/200 seconds.
 (iii) Find the time taken to reach 10 amperes for the first time. 9

OR

- VIII (a) Differentiate between self induced emf and mutually induced emf. 6
- (b) The self inductance of a coil of 500 turns is 0.25 H. If 60% of the flux is linked with a second coil of 10000 turns, calculate :
- (i) The mutual inductance of the two coils.
- (ii) E M F induced in the second coil when current in the first coil, changes at the rate of 100 A/second. 9

UNIT – IV

- IX (a) Analyse the affect of a reactance in a R L series circuit. 6
- (b) A non inductive resistance of 10 ohms is connected in series with an inductive coil across 200 V, 50 Hz supply. The current drawn by the series combination is 10 A. The resistance of the coil is 2 ohms. Determine :
- (i) Inductance of the coil
- (ii) Power factor
- (iii) Voltage across the coil. 9

OR

- X (a) Analyse phaser method used to solve parallel circuits with an example. 6
- (b) Find the current in the circuit, if 2 impedance of $25 + j40$ ohms and $35 - j60$ connected in series across a voltage $V = 220 \angle 30^\circ$ V. Draw the phaser diagram. 9

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