

TED (10)-3004

(REVISION—2010)

Reg. No. 11031218

Signature *Vy sekh*

SECOND SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING—OCTOBER, 2011

BASIC ELECTRICAL ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

PART—A

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

Marks

1. Give the variation of current in an incandescent lamp when it is ON.
2. Give any two application of variable capacitor.
3. Define self inductance.
4. Give the maximum 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 Thevenin's source.
2. Analyse the affect, when two metal plates of area $A \text{ m}^2$ placed in parallel with a distance $d \text{ m}$. in air.
3. Give the assumptions made to find the co-efficient of coupling between two coils.
4. Show the variation of resistance, inductive reactance, capacitive reactance and impedance when a RLC series circuit, supplied with a constant voltage with variable frequency.
5. Perform the following operation and express the final result in polar form.
 $5 \angle 30^\circ + 8 \angle -30^\circ$.
6. Prove that the energy stored in a magnetic field is $\frac{1}{2} L I^2$, where L is the self inductance and I is the circuit current.
7. Compare magnetic circuit and electrical circuit with respect their similarities and dissimilarities.

(5x6=30)

PART—C

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

UNIT – I

- III (a) Differentiate between dependent and independent sources. 6
 (b) Two coils connected in series have resistance of 600 ohms and 30 ohms and temperature coefficient of 0.1% and 0.4% per°C respectively. Find the resistance of combination at a temperature of 50° C. What is the effective temperature co-efficient of the combination at 50°C? 9

OR

- IV (a) Find the branch currents of an electric network having 2 resistances R_1 & R_2 in parallel, in terms of main current. 6
 (b) An electric iron 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 1.5 A? 9

UNIT – II

- V (a) Make a relation to obtain the capacitance of an isolated sphere. Give the assumptions made. 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 1000 turns. Calculate the current required to produce an air gap flux of 0.5mWb if leakage factor is 1.2 and stacking factor is 0.9 9

OR

- VI (a) Identify the different regions in the BH curve. 6
 (b) Analyse the force exerted in current carrying conductor, when it is placed in a magnetic field. 9

UNIT – III

- VII (a) Give the conditions required to generate an e.m.f in a circuit according to Faraday's laws of electro magnetic induction. 6
 (b) An alternating voltage is given by $e = 20 \sin 600t$. Find : 9
 (i) Frequency
 (ii) RMS value of voltage
 (iii) Average value of voltage.

OR

- VIII (a) Give the different parameters which will change the frequency of generated e.m.f in an AC generator. Give the importance of supply frequency in daily life. 6
 (b) If a coil of 500 turns is linked with a flux 0.01wb when carrying current of 10A. Calculate the inductance of coil. If this current is uniformly reversed in 0.01sec. calculate the induced electromagnetic force. 9

$C = 100 \times 10^{-6}$
 $L = 0.05$
 $X_L = 2\pi fL$
 $X_C = \frac{1}{2\pi fC}$

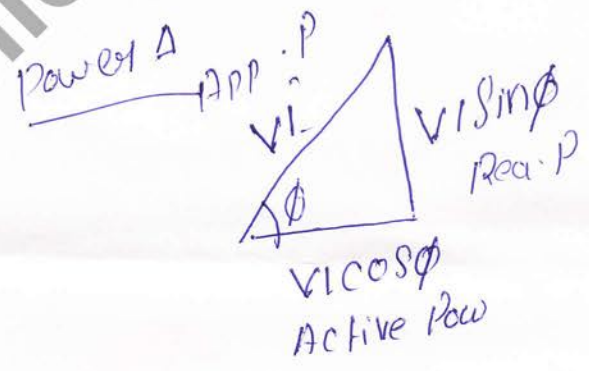
- IX (a) Analyse the impedance of a resistance inductance series circuit.
 (b) A choke coil having a resistance of 10 ohms and inductance of 0.05 H is connected in series with a capacitor of 100 micro farad. The whole circuit has been connected to 200 V, 50 Hz supply. Calculate :

$\sin \phi = \frac{X_L - X_C}{Z}$

- (i) Impedance $Z = \sqrt{R^2 + (X_L - X_C)^2}$
- (ii) Current $I = \frac{V}{Z}$
- (iii) Power factor $\cos \phi$
- (iv) Active power $P = VI \cos \phi$
- (v) Reactive power $Q = VI \sin \phi$

OR

- X (a) Analyse phaser method used to solve parallel circuits with an example.
 (b) Find the current in the circuit, if an impedance of $35 + j31.42$ ohms, connected across a voltage $V = 220 \angle 30^\circ$ V. Draw the phaser diagram.



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