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(REVISION — 2015)

Reg. No. ....

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THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS ENGINEERING — APRIL, 2017

FUNDAMENTALS OF AC SYSTEM

[*Time* : 3 hours

(Maximum marks : 100)

PART — A
(Maximum marks : 10)

Marks

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

1.   Define RMS value of an alternating current.

2.   Define capacitive reactance.

3.   State phase sequence of three phase system.

4.   Write the equation for finding 3 phase AC power.

5.   List any two power factor correction equipment.   (5×2 = 10)

PART— B
(Maximum marks : 30)

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

1.   Compare AC and DC system.

2.   An alternating current is given by i = 140 sin 314t. Find

   (a)   The average value

   (b)   Instantaneous value when t is in 6ms

   (c)   Time period

3.   Explain the Form factor and crest factor with equation.

4.   Explain AC through RL series circuit with relevant vector diagram.

5.   Explain advantages of poly phase system.

6.   Explain three wattmeter method for power measurement in 3 phase system.

7.   Draw and explain power triangle.   (5×6 = 30)

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PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Two alternating quantities are represented as A = 15 + j10, B = 12 + j6. Find

   (i) A + B (ii) A – B (iii) A × B (iv) A / B   8

(b) Explain relation between :

   (i) Time period and frequency

   (ii) Angular velocity and frequency

   (iii) Frequency and speed   7

OR

IV (a) Derive the equation for instantaneous value of alternating voltage.   8

(b) Define the following :

   (i) Instantaneous value

   (ii) Maximum value

   (iii) Average value   7

UNIT — II

V (a) Explain alternating current through RLC series circuit with relevant vector diagram.   8

(b) A coil is connected in series with a 20 µF capacitor. With a constant supply voltage of 200V it is found that the circuit take maximum currents of 50A when supply frequency is 100 Hz. Calculate :

   (i) Resistance of the choke coil

   (ii) Voltage across capacitor

   (iii) Q-factor of the circuit   7

OR

VI (a) A 230v, 50Hz AC supply is applied to a coil of 0.08H inductance and 3.5 ohm resistance connected in series with 6.8 micro farad capacitor. Calculate :

   (i) Impedance (ii) Current

   (iii) Phase angle (iv) Power consumed   8

(b) Explain alternating current through RL parallel circuit with relevant vector diagram.   7

UNIT — III

VII (a) Compare star and delta systems.   8

(b) A balanced 3 phase load consists of three coils each of resistance 4Ω and inductance 0.02 H. Determine the total power when the coil are

   (i) Star connected

   (ii) Delta connected to 400v, 3-phase, 50 Hz supply   7

OR

Marks

VIII (a) Differentiate single phase and three phase system. 8

(b) A balanced delta connected load takes a line current of 18A at pf of 0.85 leading from a 400v, 3 phase, 50 Hz supply. Calculate load resistance per phase. 7

UNIT — IV

IX (a) Derive the equation for power in a 3 phase balanced load using two wattmeter method. 8

(b) List the methods of improving power factor. 7

OR

X (a) A three phase load has a pf of 0.397 lagging. Two wattmeter connected to measure power show the input as 30KW. Find the reading on each wattmeter. 8

(b) Differentiate between balanced load and unbalanced load. 7