TED (15) – 3033

(REVISION — 2015)

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

FUNDAMENTALS OF AC SYSTEM

[*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 Form factor of an alternating current.

2.   State Power factor in an AC system.

3.   If Phase current = 100A, find Line current in three phase Delta connected system.

4.   Describe lagging power factor.

5.   List any two power factor correction equipment.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1.   Derive the equation of alternating voltage and current.

2.   An alternating current is given by i = 120 sin 314t. Find

   (a) The maximum value (b) Frequency (c) Time Period.

3.   Define admittance and susceptance in AC circuit.

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

5.   Distinguish between star and delta connections.

6.   Explain any two method used for power factor improvement.

7.   Explain power factor in leading and lagging loads.

(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)   Derive the equation for RMS value of alternating voltage.   8

   (b)   Where X = 6 + j8, Y= 3 + j4 find X – Y, X + Y in polar and rectangular form.   7

OR

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[P.T.O.

Marks

✓ (a) Define the terms: (i) Frequency (ii) Average value (iii) Amplitude (iv) RMS value. 8

(b) A 60 Hz Sinusoidal voltage has a maximum value of 36.56 volt. Find the value of voltage 0.0025 Sec. after passing through maximum positive value. At what time measured from a positive maximum value will instantaneous voltage be 14.14V. 7

Unit — II

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

(b) A 10 ohm resistor, a 15.9mH inductor and 159 micro farad capacitor are connected in parallel to a 200V, 50Hz source. Calculate the supply current and power factor. 7

Or

I (a) A 230v, 50Hz AC supply is applied to a coil of 0.06 H Inductance and 2.5 ohm Resistance connected in series with 6.8 micro farad capacitor. Calculate :

(i) Impedance (ii) Voltage across capacitor

(iii) Phase angle (iv) Power consumed. 8

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

Unit — III

I (a) List and explain the advantages of poly phase system. 8

(b) Three similar coils connected in star take a total power of 1.5 Kw at a pf of 0.2 lagging from a 3 phase, 400V, 50 Hz supply. Calculate the resistance and Inductance of each coil. 7

Or

I (a) Differentiate the balanced Star/Delta and Delta/Star conversions. 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

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

(b) Two wattmeter method is used to measure the power taken by a 3 Phase, Induction motor on no load. The watt meter readings are 375 W and -50 W. Calculate :
(i) Power factor
(ii) Phase angle between voltage and current in two wattmeters. 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) Explain the method for finding reactive volt ampere by using one wattmeter in