FAC. 4

TED (15) – 3033 Reg. No.....

(REVISION — 2015) Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

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 RMS value of an alternating current.
2. State condition for resonance and frequency in series AC circuit.
3. Draw the impedance triangle.
4. Define poly phase.
5. List out methods of improving power factor. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. List the advantages of AC over DC supply.
2. Derive the expression for RMS value in an AC System.
3. Draw and explain the AC through RL series circuit.
4. Explain advantage of poly phase system.
5. Draw and explain power triangle.
6. List the various methods used to measure 3-phase power.
7. Compare balanced and unbalanced load. (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) Draw and explain the generation of alternating voltage. 8

(b) Where A = 30+j52, B = -39.5-j14.36 find A-B convert result to polar form. 7

OR

Marks

IV (a) Define the terms :

(i) Frequency (ii) Phase

(iii) Amplitude (iv) Time period. 8

(b) The equation of an AC is I = 42.42 sin 628t determine :

(i) RMS value (ii) Frequency

(iii) Average value (iv) Form and peak factor 7

UNIT — II

V (a) Prove mathematically the power in a pure inductive AC circuit is equal to zero. 8

(b) A coil having a resistance of 7 ohm and an inductance of 31.8 mH is connected in series to 230v, 50Hz supply. Calculate :

(i) Circuit current (ii) phase angle

(iii) power factor (iv) power consumed 7

OR

VI (a) Derive the equation for impedance, current, phase angle, power and power factor for RLC series circuit with phasor diagram. 8

(b) A 230v, 50Hz load takes 70 A and operates at a pf 0.75 lagging. If a capacitor of 159 micro farad is connected in parallel with the load, find line current and pf. 7

UNIT — III

VII (a) Derive the expression for line current and power in delta connected system. 8

(b) A 3-phase load of three equal impedance connected in delta, when apply 400 V, 50 Hz supply takes a line current of 10 A at power factor 0.7 lag. Calculate the circuit constants per phase and total reactance power. 7

OR

VIII (a) Express delta to star transformation. 8

(b) Compare star and delta system. 7

UNIT — IV

IX (a) Express the equation for power factor using two wattmeter method (balanced load). 8

(b) The power input to a 2000 V, 50Hz 3- phase motor running on full load efficiency 90% is measured by two wattmeter method. Calculate the input power, power factor, line current, output power in HP. 7

OR

X (a) What are the effects of load p.f. on wattmeter reading. 8

(b) Three identical coils each having R = 20Ω, X_L = 20Ω connected in delta apply 440V, 50Hz 3 - phase supply. Calculate the line current and reading on each power of the two wattmeter connected to measure power. 7
