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N22 – 06088

Reg. No……………………
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2022

FUNDAMENTALS OF AC SYSTEMS

[Maximum Marks: **100**] [Time: **3** Hours]

PART-A

[Maximum Marks: **10**]

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

1. Define the terms time period and frequency of an ac wave.
2. Describe the term capacitive reactance.
3. List the names of interconnections available in three phase system.
4. Write the equation for three phase AC power.
5. Write two examples for power correction equipments. (5 x 2 =10)

PART-B

[Maximum Marks: **30**]

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

1. Distinguish between form factor and crest factor.
2. Describe the generation of alternating voltage.
3. Prove that the total power consumed by a pure inductor is zero in an AC circuit.
4. Illustrate AC through resistance and inductance connected in series.
5. Compare star and delta connections in three phase system.
6. Summarize any six advantages of poly phase system.
7. Explain three phase power measurement by three wattmeter method. (5 x 6 =30)

PART-C

[Maximum Marks: **60**]

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

UNIT – I

III. (a) If A= 10+25j and B = 7-13j interpret A+B in

(i) Rectangular form. (ii) Polar form (iii) Trigonometric form (8)

(b) Derive the expression for AC voltage generated. (7)

OR

IV. (a) An AC voltage generated is represented as V = 45 sin(471t) then find.

(i)Maximum value. (ii) instantaneous value at t = 2msec.

(iii) Average value. (iv) RMS value. (8)

(b) Summarize any six advantages of AC over DC. (7)

UNIT – II

V. (a) Illustrate AC through resistance, inductor and capacitor connected in series. (8)

(b) In a series R-L-C resonant circuit having resistance of 4 ohm and inductance of 5H connected to 230V, 50Hz supply find (i) capacitance (ii) current. (7)

OR

VI. (a) Explain resonance effect in series R-L-C circuit with neat sketches. (8)

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

(i) current (ii) phase angle (iii) power factor (iv) power consumed. (7)

UNIT- III

VII. (a) Illustrate the star mode of interconnection in three phase system with phasor diagram. (7)

(b) Three equal star connected coils take 8 KW at a power factor of 0.8 lag when connected across a 460V, three phase supply. Find circuit constants per phase. (8)

OR

VIII. (a) Explain the delta connection with relevant circuit diagram and vector diagram. (7)

(b) A balanced delta connected load of (8+6j) ohm per phase connected to a balanced three phase 400V supply. Find (i) Line current. (ii) Power factor. (iii) Active power. (8)

UNIT - IV

IX. (a) Describe two wattmeter method of power measurement in three phase system. (8)

(b) Explain the method of reactive power measurement using single wattmeter. (7)

OR

X. (a) Define the term power factor and explain the need of power factor improvement. (8)

(b) Describe single wattmeter method for power measurement in three phase system. (7)

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