Total No. of Questions – [4] Total No. of Printed Pages 2

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F. Y. B.TECH. (COMMON) (SEMESTER - I)

COURSE NAME : BASIC ELECTRICAL ENGINEERING

(2017 PATTERN)

Time : [1 Hour] [Max. Marks : 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q 1) a) Derive with the help of a neat phasor diagram an expression showing the relationship between line current and phase current for a three phase balanced delta connected load which has a lagging power factor and connected across a symmetrical three phase a.c. supply. [6]

b) Derive an expression for total active and reactive power consumed by a three phase balanced delta connected load in terms of line quantities. [4]

c) A balanced star connected load of (8 + j6) Ω per phase is connected to a balanced 3 phase 400-V supply. Find the line voltage, line current, phase voltage, power factor, total active and reactive power. [6]

OR

Q2) a) Draw a neat connection and phasor diagram for a three phase balanced star connected resistive load of resistance R in each phase across a symmetrical three phase a.c. supply. Mark the line currents, line voltages, phase voltages and phase currents on the connection as well as phasor diagram. [6]

b) A balanced delta connected load of (8 + j6) Ω per phase is connected to a balanced 3 phase, 400 V, 50 Hz ac supply. Find the line current, phase current, phase voltage, power factor, total active and reactive power. [6]

c) If two wattmeters are connected for measuring power for delta connected load as given in Q.2(b) with one of the watt-meter readings as 27.51 kW, find the reading on the other wattmeter. Also find the power factor angle. [4]

Q3) a) Derive an expression for rms value of emf induced in primary and secondary winding of a transformer with N_1 and N_2 as number of turns on primary and secondary windings and connected across a single phase ac supply of frequency f. [6]

b) A 600 KVA transformer has iron losses of 4 kW and full load copper losses are 8 kW. Calculate the efficiency of transformer at i) half load ii) full load with 0.8 p.f. lagging. [4]

c) If the transformer as given in Q.3(b) has voltage rating of 3300/440 V. Calculate its full load current on primary and secondary side. If primary is connected to 3300 V, 50 Hz ac supply, calculate maximum flux [redacted] in the core if the primary winding has 1000 turns. [4]

OR

Q4) a) Write a note on autotransformer pertaining to following points:
i. Circuit diagram ii. Advantages iii. Disadvantages iv. Applications [6]

b) A single phase transformer has 500 and 1200 turns respectively on its primary and secondary. Cross sectional area of core is 80 cm^2. If primary is connected to 500 V, 50 Hz ac supply, calculate e.m.f. induced in secondary and maximum flux density in the core. [4]

c) Find the full load current in primary and secondary windings of the transformer as given in Q.4(b) if its rating is 5 KVA. If the primary winding is connected to 500 V, 60 Hz ac supply with cross sectional area of core as 80 cm^2, calculate maximum flux density in the core. [4]