Roll No.

Total Pages : 4

ВТ-1/D-24 41066

BASIC ELECTRICAL ENGINEERING

Paper-B24-ESC-104

Time Allowed : 3 Hours] [Maximum Marks : 70

All questions are compulsory. The question carrying ten marks in each unit shall have a choice in attempting any of the one option.

UNIT-I

- 1. Convert a set of delta connected equal resistors (each value R) into equivalent star configuration. (CO1) $2\frac{1}{2}$
- 2. Define the Maximum Power Transfer Theorem and mathematically deduce its condition. (CO1) 5
- 5. Find Norton's equivalent of Circuit shown in Fig.-1 (below), w.r.t. the load resistor of 5Ω .



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Or

Find Thevenin's equivalent of ckt. Shown in Fig.-1 ($ab_{0v_{C_j}}$, w.r.t the load resistor of 10 Ω . (CO1) 16

UNIT-II

4. The Voltage applied to an AC circuit is $500\sqrt{2} \sin (500\pi t)$ volts and the Circuit draws a current of :

 $20\sqrt{2} \sin\left(500\pi t + \frac{\pi}{4}\right)$ ampere. Taking voltage as the reference phasor, find its frequency, power factor, active power, reactive power, apparent power. (CO2) 2½ Given in volts : (CO2) 5

 $V_1 = 50 \operatorname{Sin} \omega t, V_2 = 100 \operatorname{Sin}(\omega t + 135^\circ),$

 \sim V3 = 200 Sin (ω t - 135°).

Find $V = V_1 + V_2$ in sinusoidal periodic form.

6. Explain in detail type-theory of AC input response of series R-C ckt. with deducing voltage-impedance-power triangle, average power and with drawing neat waveforms of instantaneous values of voltage, current and power on simultaneous time-axis.

Or

Explain in detail the theory of AC input response of series R-L ckt. with deducing voltage-impedance-power

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5.

triangle, average power and with drawing neat waveforms of instantaneous values of voltage, current and power on simultaneous time-axis. (CO2) 10

UNIT-III

- Draw a neat labelled diagram and Equivalent circuit of a single phase transformer. (CO3) 2¹/₂
- 8. Deduce the expression between line and phase voltages for a balanced for a balanced star 3-phase system. (CO3) 5
- 9. On a single phase transformer, explain the following :
 - (a) Open circuit test.
 - (b) Short circuit test.

Or

Explain in detail the two wattmeter method of Power measurement for a Delta connected load (any type) with suitable steps containing ckt. equations, neat phasor and ckt. diagram. (CO3) 10

UNIT-IV

- Give functions of an armature coil in case of Generator and Motor. (CO4) 2¹/₂
- 11. Explain one method of speed control of a DC shunt motor and suitable ckt. diagram. (CO4) 5

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P. T. O.

12. Explain with sketches the construction and working of a
DC generator with commutator working.

Or

Taking X-axis intervals of 30 degrees each, draw neatly the waves on simultaneous axis : (CO4) 10

 $V_1 = V_m \operatorname{Sin} \omega t, V_2 = V_m \operatorname{Sin}(\omega t - 120^\circ) \&$

 $V_3 = V_m \sin(\omega t - 240^\circ).$

Hence, with neat sketches, explain and prove the statement : 'A 3 phase pulsating magnetic flux producted by 3-phase excited stator winding is equivalent to a single (bipolar) rotating flux'. Hence, briefly explain how the rotor of a squirrel cage type 3-phase induction Motor starts rotating? R