Roll o ..... Total Pa es

BT–1/D-24 **41066**

BASIC ELECTRICAL ENGINEERING

Paper–B24–ESC–104

Time . llowed : 3 Hours] |Maximum Marks : 70

Note : All questions are compul ory. The question carrying **ten** marks in each unit shall have a choice in attempting an of the **one** option.

UNIT–I

1. Convert a set of delta connected equal resistors (each alue R) into equivalent star configuration. (CO1) 2½

2. Define the Maximum Power Transfer Theorem and mathematically deduce its condition. (CO1) 5

3. Find Norton's equivalent of Circuit shown in Fig.–1 (below), w.r.t. the load resistor of 5 Ω.

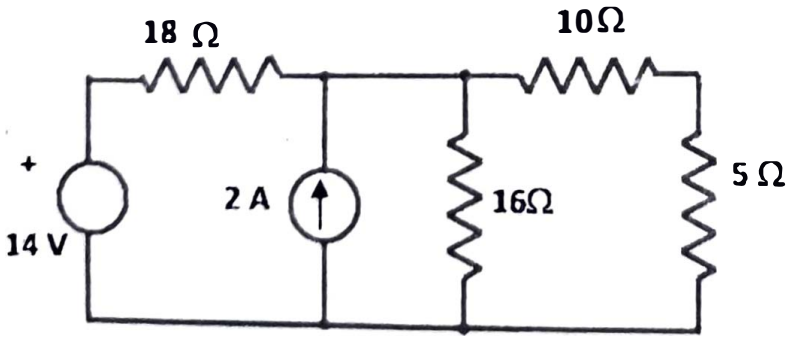

Fig-1

Or

Find Thevenin's equivalent of ckt. Shown in Fig.–1 (above), w.r.t the load resistor of 10 Ω. (CO1) 10

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

5. Given in volts : (CO2) 5

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

$V3 = 200\ \text{Sin}\ (\omega t - 135^\circ)$.

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

6. Explain in detail tyhe 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

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

UNIT–III

7. Draw a neat labelled diagram and Equivalent circuit of a single phase transformer. (CO3) 2½

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

10. Give functions of an armature coil in case of Generator and Motor. (CO4) 2½

11. Explain one method of speed control of a DC shunt motor and suitable ckt. diagram. (CO4) 5

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

$V_1 = V_m \text{ Sin } \omega t$, $V_2 = V_m \text{ Sin}(\omega t - 120°)$ &

$V_3 = V_m \text{ Sin}(\omega t - 240°)$.

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?