JOIN

PUNE ENGINEERS

Telegram
@PuneEngineers

For more Subjects

https://www.studymedia.in/fe/notes

CLICK HERE
@PuneEngineers

SCAN ME

Total No. of Questions : 8]

SEAT No. :

PA-4298

[Total No. of Pages : 4

[5924]-7

F.E. (Electrical Engineering)
BASIC ELECTRICAL ENGINEERING
(2019 Pattern) (Semester - I/II) (103004)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data wherever necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Calculate power factor angle and power factor in following cases : **[4]**

i) $Z = 10 + j10\ \Omega$

ii) $Z = 30 - j20\ \Omega$

b) If a single-phase AC supply is connected to RC circuit, answer the following. **[6]**

i) Draw circuit digram indicating all voltage drop and current.

ii) Write equation for impedance and current.

iii) Draw the phasor diagram.

c) A coil of 100mH is connected in series with 25Ω resistance across 230V, 50 Hz supply. Find **[8]**

i) Inductive reactance and impedance

ii) Current trhough circuit

iii) Voltage drop across each element

iv) Active power

OR

P.T.O.

Q2) a) A sinusoidal voltage $V = V_m \sin \omega t$ applied across pure resistance circuit. Derive expression active power consumed by the circuit. **[4]**

b) A pure capacitance of 100μF is conncted across single phase voltage given by $v = 100 \sin (314t)$ volts. Find **[6]**

i) Frequency of supply in Hz

ii) Capacitive reactance

iii) Equation of current

c) A resistance 20Ω. inductance of 50mH and capacitor of 75μF are connected in series across 230V, variable frequency supply. **[8]**

Calculate :

i) The frequency at which resonance will occur

ii) Current flowing through circuit

iii) Power factor

Q3) a) State the advantages of 3– ph system over 1-ph system (any 3) : **[3]**

b) What are the different losses in the transformer? In which party they take place and how to minisie them. **[6]**

c) A three phase load having per phase impedance (30 + j40)Ω is connected in star across 400V, 50Hz, 3-phase AC supply. **[8]**

Determine :

i) Line and phase voltage

ii) Line and phase current

iii) Power factor and power factor angle

iv) Active, reactive power

OR

Q4) a) State following statements are true or false with justification. **[3]**

i) In transformer, as the load current increases, iron losses increase.

ii) In transformer, as the load current increases, copper losses increase.

b) Derive emf equation of a single-phase transformer. **[6]**

c) Draw circuit diagram for delta load (RL types) connected across three phase balanced supply and derive relation between line and phase current and voltage. Also draw the phasor diagram. **[8]**

Q5) a) Define following terms : **[4]**

i) Active and passive network

ii) Linear and non-linear network

b) Find the current following through 2Ω resistance using KVL. (Refer Fig. 5(b) **[6]**

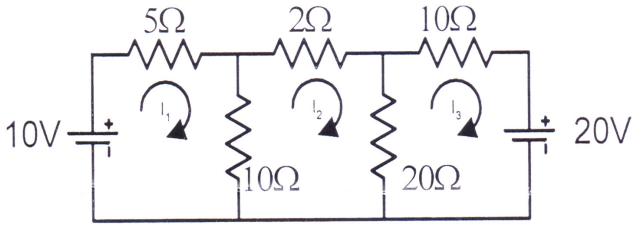

Figure 5b)

c) Determine equivalent resistance between XY Refer Fig. 5(c). **[8]**

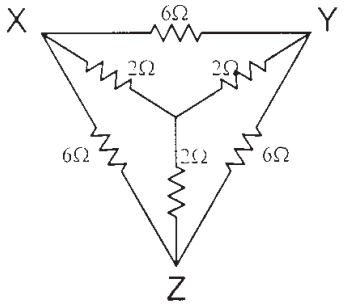

Figure Q5c)

OR

Q6) a) State and explain KCL and KVL. **[4]**

b) i) Three resistance each 60Ω are connected in delta, draw its equivalent star.

ii) Three resistance each 60Ω are connected in star, draw its equivalent delta.

[6]

c) Write the steps to find current I_L in given circuit using Thevenin's theorem. **[8]**

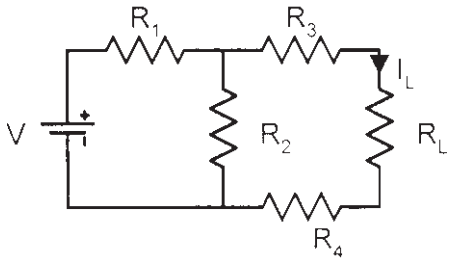

Fig Q6c)

Q7) a) State following statements are true or false with justification. **[3]**

i) A wire is having resistance of 10Ω. If the length of wire is doubled, then new resistance is 5Ω.

ii) A wire is having resistance of 10Ω. If the diameter of wire is doubled, then new resistance is 2.5Ω.

b) Explain construction, working of Lithium Ion Battery. **[6]**

c) Derive the formula for insulation resistance of a single core cable. State the factors affecting insulation resistance. **[8]**

OR

Q8) a) State the three conditions of fully charged lead acid battary. **[3]**

b) Explain construction, working and applications of Lead acid Battery. **[6]**

c) A wire is having resistance 10Ω, 20ºC, Its RTC at 0ºC is 0.004/ºC. Calculate :

i) RTC at 20ºC

ii) Resistance of wire at 50ºC

iii) The temperature at which resistance increases to 15Ω.