Total No. of Questions : 8]

SEAT No. :

PE4248

[Total No. of Pages : 2

[6582]-19

S.E. (Electrical Engineering)

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(2019 Pattern) (Semester - III) (203144)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Attempt 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 indicates full marks.***

Q1) a) Explain one wattmeter method for measuring active power in a 3-phase balanced R & L load. Draw respective circuit diagram. **[8]**

b) A 3 phase 500V motor load has a power factor of 0.4, Two watt meters are connected to measure power. They show total power of 30 kW, find reading of each wattmeter. **[6]**

c) Explain low power factor wattmeter. **[4]**

OR

Q2) a) A 3 phase, 10 KVA has a power factor of 0.342 the power is measured by two wattmeter method find reading of each wattmeter when PF is **[8]**

i) Lagging

ii) Leading

b) Draw the possible method of connecting the pressure coil of a wattmeter and compare the errors. Explain the use of "compensation winding" in a wattmeter. **[6]**

c) What is Blonded theorem explain briefly. **[4]**

Q3) a) With suitable block diagram explain working of electronic energy meter. **[6]**

b) Explain in detail the working and construction of single phase induction type energy meter with a neat diagram. **[8]**

c) Explain in brief TOD Meter. **[3]**

OR

P.T.O.

Q4) a) A single phase energy meter rated 200 volt, 50 Hz, 3200 impulses per kWh is connected across 200 volt supply and the load consists of 40Ω resistance. This circuit is on for 30 minutes. The energy meter completes 1590 blinks during this time. Determine percentage error in the energy meter. **[8]**

b) With a suitable circuit diagram explain calibration of single phase energy meter. **[6]**

c) Define energy, explain in brief energy measurement. **[3]**

Q5) a) With suitable diagrams explain phase angle and frequency measurement using Lissajous pattern in CRO. **[4]**

b) Explain any one electrical transducer used for pressure measurement. **[6]**

c) With suitable diagram explain constructional details of CRT. **[8]**

OR

Q6) a) With suitable diagrams explain working of resistive transducers and inductive transducers. **[8]**

b) Explain capacitive transducers for pressure measurement with a neat diagram. **[6]**

c) On CRO screen sinusoidal signal of total occupancy vertical 3cm and horizontal 2cm. The front panel control of Volts/div & Times/div are 2 v/div & 2 ms/div respectively. Calculate **[4]**

i) r.m.s. value of voltage

ii) Frequency

Q7) a) With suitable diagram explain construction and working of semiconductor strain gauge. State any two advantages of it. **[8]**

b) Explain any one Electrical method for measurement of level. **[6]**

c) Draw a schematic diagram of LVDT. Label all the parts. **[3]**

OR

Q8) a) Explain level measurement by mechanical method. **[3]**

b) With suitable diagram explain ultrasonic method of level measurement. **[6]**

c) What are the advantages and disadvantages of a Linear Variable Differential Transformer (LVDT)? Explain how the magnitude and direction of displacement of core of an LVDT detected? **[8]**