

Total No. of Questions—8]

[Total No. of Printed Pages—3

Seat No.	
-------------	--

[5559]-154

S.E. (Electrical) (I Semester) EXAMINATION, 2019
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION
(2015 PATTERN)

Time : Three Hours

Maximum Marks : 50

- N.B. :—** (i) Attempt Q. No. 1 Or Q. No. 2, Q. No. 3 or Q. No. 4,
Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
(ii) Neat diagrams must be drawn wherever necessary.
(iii) Figures to the right indicate full marks.
(iv) Use of logarithmic tables slide rule, Mollier charts, electronic
pocket calculator and steam tables is allowed.
(v) Assume suitable data, if necessary.

1. (a) Compare the following methods of damping on minimum six
points : [6]
(i) Air friction damping
(ii) Fluid friction damping
(iii) Eddy current damping.
- (b) With suitable circuit diagram explain Kelvin's double bridge
used for measurement of low resistance. Also derive the expression
for unknown resistance at balance condition. [7]

P.T.O.

Or

2. (a) A PMMC instrument gives reading of 20 mA when potential difference across its terminals is 60 mV. Find :
- (i) Shunt resistance required to measure current upto 100 Ampere.
 - (ii) Multiplier resistance required to measure voltage upto 300 volt.
- Draw diagrams for above cases and mark respective quantities in it. [7]
- (b) With suitable diagram explain construction and working of Megger instrument. [6]
3. (a) Three equal impedances each consisting of (R + L) series elements are connected in star across 400 volt, 50 Hz, 3-phase, 3 wire balanced supply. The power of this circuit is measured by 2 wattmeter method. The two wattmeters read 3 kW and 1 kW respectively. Find the value of R and L in each phase. [6]
- (b) With a suitable circuit diagram explain calibration of single phase energy meter. [6]

Or

4. (a) A single phase energymeter rated 200 volt, 50 Hz, 3200 impulses per kWh is connected across 200 volt supply and the load consists of 40 Ω resistance. This circuit is on for 30 minutes. The energymeter completes 1590 blinks during this time. Determine percentage error in the energymeter. [6]

- (b) With suitable circuit diagram and phasor diagram explain one wattmeter method for reactive power measurement in 3-phase (R + L) load. Derive the expression for wattmeter reading. [6]
5. (a) Explain how phase angle and phase shift is measured using CRO. [7]
- (b) Explain any *two* electrical transducers used for pressure measurement. [6]

Or

6. (a) With suitable diagrams explain working of resistive transducers and inductive transducers. [7]
- (b) With suitable diagram explain constructional details of CRT. [6]
7. (a) State the methods of level measurement. Explain pneumatic method of level measurement with suitable diagram. [6]
- (b) (i) Explain construction and working of RVDT with suitable diagram. [4]
- (ii) State any *two* applications of LVDT. [2]

Or

8. (a) With suitable diagram explain construction and working of semiconductor strain gauge. State any *two* advantages of it. [6]
- (b) (i) Draw and explain output characteristics of LVDT. [4]
- (ii) State any *two* desirable characteristics of resistance strain gauge. [2]