

Total No. of Questions—8]

[Total No. of Printed Pages—3

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**S.E. (Electrical) (First Semester) EXAMINATION, 2018**  
**ELECTRICAL MEASUREMENTS AND INSTRUMENTATION**  
**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Neat diagrams must be drawn wherever necessary.

(ii) Figures to the right indicate full marks.

(iii) Use of logarithmic table, slide rule, Mollier chart, electronic pocket calculator and steam table is allowed.

(iv) Assume suitable data, if necessary.

1. (a) Draw a neat schematic diagram of attraction type moving iron instrument and explain deflecting, controlling, and damping system used in it. [6]

(b) With a circuit diagram derive the equation for an unknown self inductance by Anderson's bridge. [6]

*Or*

2. (a) Design a multi range d.c. milli-ammeter using a basic movement with an internal resistance  $R_m = 50 \Omega$  and a full scale deflection current  $I_m = 1 \text{ mA}$ . The ranges required are 0–10 mA; 0–50 mA; 0–100 mA; and 0–500 mA. [6]

(b) Draw circuit diagram of Kelvin's double bridge. Derive expression for unknown resistance with usual notations. [6]

P.T.O.

3. (a) 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]
- (b) A 230 V single phase energy meter has constant load of 5 A passing through it for 8 hours at a power factor of 0.9. If the meter LED makes 26500 impulses during this period, find the meter constant in imp/kwh. calculate the power factor of the load if the no. of impulses are 11230 when operating at 230 V and 6 A for 5 hours. [7]

Or

4. (a) While performing a load test on a 3 phase wound rotor induction motor by two wattmeter method, the readings obtained on two wattmeters were + 14.2 kW and -6.1 kW and line voltage was 440 V. [6]

Calculate :

- (i) True power drawn by the motor
- (ii) Power factor
- (iii) Line current.
- (b) With a neat schematic diagram, explain construction of two element energy meter. [7]
5. (a) Explain the following terms associated with CRO: [6]
- (i) Volts/division
- (ii) Invert
- (iii) dual ch
- (iv) x-position
- (v) xy-mode
- (vi) y-position.

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

*Or*

6. (a) Draw and explain block diagram of Digital Storage Oscilloscope. [6]

(b) Explain McLeod gauge for measurement of pressure. [6]

7. (a) Explain level measurement by mechanical method. [6]

(b) Define strain. What are the types of strain gauge ? Explain wire strain gauge. [7]

*Or*

8. (a) Explain Electrical method for measurement of level. [6]

(b) 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 ? [7]