



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:III
Class:SY	Program:B.Tech
Branch Code:ELE	Pattern:2023
Name of Course:Measurement and Instrumentation	Course Code:2306202
Max. Marks:30	Duration:1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

- (1) Q.1 and Q.3 are compulsory.
- (2) This question paper contains __02__ no. of page(s).
- (3) Answer to each new question is to be started on a fresh page.
- (4) Assume suitable data wherever required, but justify it.
- (5) Draw the neat labelled diagrams, wherever necessary.

Marks CO

Question No. 1

- | | | |
|---|-----|---|
| 1 a) Explain the mechanism by which controlling torque is produced and how it ensures accurate readings | (3) | 1 |
| 1 b) Describe the mechanisms used for damping and controlling torque in PMMC instruments. Why is damping essential in PMMC instruments? | (4) | 1 |

Question No. 2

- | | | |
|---|-----|---|
| 2 a) Describe the sources of systematic errors. How can these errors be minimized or compensated for? | (4) | 1 |
| 2 b) Explain what is meant by the phase angle error in a Current Transformer (CT) and a Potential Transformer (PT)? | (4) | 2 |

OR

- | | | |
|---|-----|---|
| 2 c) Describe the working principle of an dynamometer type Ammeter instrument. How does the interaction between the coils lead to the measurement of electrical quantities? | (4) | 1 |
| 2 d) Derive and explain the torque equation of attraction type MI instrument. | (4) | 2 |

Question No. 3

- | | | |
|--|-----|---|
| 3 a) Describe the construction of single-phase induction-type energy meter. | (3) | 2 |
| 3 b) What are the main causes of errors in a low power factor watt-meter and how are they compensated for? | (4) | 2 |

Question No. 4

- 4 a) What are the common adjustments that can be made to a single-phase induction-type energy meter to ensure accuracy? (4) 2
- 4 b) A current coil of wattmeter is connected in series an ammeter and an Inductive load. The voltmeter and voltage coil are connected across a 100Hz supply. The ammeter reading is 5 A and voltmeter and wattmeter readings are 240V and 0.022KW resp. The inductance of voltage circuit is 10mH and its resistance is 2100 ohm. If the voltage drop across the ammeter and current coil are negligible, what is the % error in wattmeter reading ? (4) 3

OR

- 4 c) What are the main sources of error in a dynamometer-type watt-meter? (4) 2
- 4 d) A wattmeter has current coil of 0.5 ohm and pressure coil of 7000 ohm resistance. Calculate %error, due to resistance only with each of method of connection, when reading the input to an apparatus which takes- a) 12A at 250V with u.p.f. b) 12A at 250V with 0.6 pf (4) 3

..... End of question paper.....