

B.E. MECHANICAL ENGG. (PART TIME) EXAM 2017
(1st Year, 2nd Semester)

MEASUREMENT & INSTRUMENTATION

Time: Three hours (Answer any *FIVE* questions)

Marks: 100

*Different parts of the same question should be answered together.
All symbols carry their usual meanings unless otherwise mentioned.
Assume any relevant data if necessary.*

1. a) Briefly explain about the different mechanical gauges used in pressure measurement. 14
 b) A differential manometer is connected between two pipes A and B containing water. 6
 Deflection of mercury manometer shows 20cm. Pipe A is 15 cm below the pipe B.
 Find the pressure head of pipe A when pressure of pipe B is maintained 2 bar. Draw
 schematic
2. a) What are the different flow measurement devices used in pipe flow? Explain briefly. 12
 b) An orifice meter of 10 cm diameter is connected with a pipe of diameter 20 cm used to 8
 measure flow of oil of sp. gr. 0.7. The discharge of oil through it is 100 litres per
 second. Find the reading of the oil-mercury differential manometer. (assume $C_d=0.98$,
 $C_c=0.9$)
3. a) Explain the working principles of thermocouples and RTDs. 10
 b) Briefly explain about the different level measurement devices (any five) used 10
 engineering applications.
4. a) Classify the static characteristics of an instrument and briefly explain. 14
 b) How static errors are classified? 6
5. a) Briefly explain the different dynamic characteristics of instrument with example. 14
 b) What do you mean by calibration chain and traceability? 6
6. a) Why signal conditioning is necessary in measurement? 6
 b) How bridge circuits and amplifiers are used in signal conditioning 14
7. Write short notes on: (any *FOUR*) 4 X 5 20
 a) Error Estimation
 b) LVDT
 c) Optical torque measurement
 d) Speed measurement
 e) Frequency measurement