

B.E. MECHANICAL ENGINEERING (PART TIME) FIRST YEAR SECOND SEMESTER EXAM 2018

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) What are the different pressure measurement devices used in engineering applications. 12
 b) An inverted U tube differential manometer is connected between two pipes A and B 6
 containing water. Deflection of oil manometer ($SG = 0.5$) shows 20cm. Pipe A is 15
 cm below the pipe B. Find the difference of pressure head between two pipes.
 c) What is pitot tube?
2. a) What are the different flow measurement devices used in engineering applications. 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. 0.6. The discharge of oil through it is 150 litres per
 second. Find the reading of the oil-mercury differential manometer. (assume $C_d = 0.96$,
 $C_c = 0.8$)
3. a) What are the different level measurement devices used engineering applications. 12
 b) Briefly explain the working principles of thermocouple. How they are classified? 8
4. a) Briefly discuss about the different characteristics of an instrument 14
 b) How static errors can be avoided? 6
5. a) How dynamic characteristics of instrument are classified? Explain with example. 14
 b) What do you mean by calibration? Explain its importance. 6
6. a) What is signal conditioning in measurement system? 6
 b) Explain how bridge circuits and amplifiers are used in signal conditioning 14
7. Write short notes on: (any **FOUR**) 4 X 5 20
 a) RTDs
 b) LVDT
 c) Torque measurement
 d) Speed measurement
 e) Frequency measurement
 f) Strain gauge

[Turn over