Ex/ME/5/T/211/2017(OLD)(S)

B. MECHANICAL ENGG (Evening) EXAM 2017

(2nd Year, 1st Semester Supplementary)

MECHANICAL MEASUREMENT AND 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 the different static characteristics of instruments. 12
   b) How static errors are classified? Explain how these can be avoided. 8
2. a) Briefly explain the different types of dynamic characteristics of instrument with example. 14
   b) What do you mean by calibration and calibration chain? 6
3. a) What do you mean by signal conditioning in measurement? 6
   b) How bridge circuits and amplifiers are used in signal conditioning 14
4. a) Briefly explain about the different gauges used in pressure measurement. 12
   b) A differential manometer is connected between two pipes A and B containing water. Deflection of mercury manometer shows 30cm. Pipe A is 25 cm below the pipe B. Find the pressure head of pipe A when pressure of pipe B is maintained 3 bar. Draw schematic 8
5. a) What are the different flow measurement devices used in mechanical measurement? Explain briefly. 12
   b) An orifice meter of 10 cm diameter is connected with a pipe of diameter 20 cm used to measure flow of oil of sp. gr. 0.8. The discharge of oil through it is 150 litres per second. Find the reading of the oil-mercury differential manometer. (assume C_d=0.98, C_c=0.9) 8
6. a) Explain the working principles of thermocouple. 5
   b) Briefly explain about the different types of level measurement devices (any five) used engineering applications. 15
7. Write short notes on: (any ***FOUR***) 4 X 5 20
   a) Torque Measurement
   b) Error Estimation
   c) LVDT
   d) Pitot Tube
   e) RTD