BACHELOR OF ENGG. (MECHANICAL ENGINEERING) EXAM 2019

FIRST YEAR SECOND 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 pressure measurement devices used in engineering application. 14

   b) A differential manometer is connected between two pipes A and B containing water. Mercury manometer shows a reading 30cm. Pipe A is 20 cm below the pipe B. Find the pressure of pipe A when pressure of pipe B is maintained at 2 bar. 6

2. a) What are the different flow measurement devices used in pipe flow? Explain briefly. 12

   b) An orifice meter of 15 cm diameter is connected with a pipe of diameter 25 cm used to 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) 8

3. a) How temperature measurement devices are classified? 5

   b) Explain the working principles of thermocouples and RTDs. 8

   c) What are different level measurement devices used engineering applications? 7

4. a) What do you mean by static characteristics of an instrument? Classify and briefly explain. 14

   b) How static errors are classified? 6

5. a) What is a dynamic characteristic of instrument? Briefly explain the different types with example. 14

   b) What is calibration? Explain its importance in measurement. 6

6. a) What is signal conditioning? Why it is necessary in measurement? 6

   b) How bridge circuits and amplifiers can be used in signal conditioning? 14

7. Write short notes on: (any ***FOUR***) 4 X 5 20

   a) Error Estimation

   b) LVDT

   c) Torque measurement

   d) Speed measurement

   e) Velocity measurement