Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PECH 5304

Fifth Semester Examination – 2013

PROCESS INSTRUMENTATION

BRANCH : BIOTECH

QUESTION CODE : C-417

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

(a) State the differences between "accuracy" and "precision".

(b) What is calibration of an instrument ?

(c) Is it possible to read the liquid levels in a tank from the ground level if the tank is kept above or below the ground level in a float type level indicator ? State the reason.

(d) Mention five types of inferential type of flow measurement systems.

(e) What are the advantages and disadvantages of a "rotameter" ? List five points for each of them.

(f) In MKS system how much is an atmospheric pressure ? If the gauge pressure of a reactor is 10 kg/cm^2, how much is the absolute pressure ?

(g) Indicate various types of errors in a "manometer".

(h) What is a strain gauge ? How does the resistance change in it ?

(i) Mention the melting point of ice and boiling point of water at a pressure of 760 mm of mercury in Centigrade and Fahrenheit scales. If the temperature of an oven is 240°C, calculate the temperature in °F.

(j) Differentiate between absorption spectroscopy and emission spectroscopy.

P.T.O.

2. (a) Define "repeatability", "sensitivity", "resolution" and "backlash" in an instrumentation system. 4

(b) Draw the block diagram showing the functional elements of an instrumentation system and explain different functional elements. 6

3. (a) Enumerate the advantages and disadvantages of a radiation level detector. 4

(b) Describe with neat sketch a capacitance level indicator and explain its working. 6

4. (a) What is a mass flow meter ? 2

(b) What are the different considerations of choosing a flow meter ? 2

(c) Describe, using a diagram, the working of a rotameter. 6

5. (a) How would you calibrate low pressure gauges ? 2

(b) What is a pressure switch ? 2

(c) Describe the basic principle and working of a strain gauge. 6

6. (a) Explain the working of a bimetallic strip. 4

(b) State the differences between resistance thermometer and thermistor. 3

(c) Why do you use compensating leads in a thermocouple ? 3

7. (a) What are the different sources of error in a radiation pyrometer ? 3

(b) Which type of radiation is used in a radiation level detector ? 2

(c) Explain a method of measurement of vacuum. 5

8. Write short notes on any **two** : 5×2

(a) Manometers

(b) Optical pyrometers

(c) Mass spectroscopy.