Code No: RR220305 | RR | SET-1

B.Tech II Year - II Semester Examinations, April/May-2012
INSTRUMENTATION AND CONTROL SYSTEMS
(MECHANICAL ENGINEERING)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

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1. Draw a schematic diagram of a pressure gauge for measurement of pressure of a fluid. Draw a generalized block diagram of the system. Explain the function of each block. [16]

2.a) What is a linear variable differential transformer? Explain its construction and working principle with a neat diagram.
b) Explain construction and working of Bimetallic thermometer with a neat sketch and state its advantages and limitations. [16]

3. Explain with diagram the operations of a DC and an AC tachogenerator. What are the reasons of their range limitations? Where are they commonly used? [16]

4.a) Describe the working principle of U-tube manometer with a neat sketch.
b) A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and right-limb is open to the atmosphere. The centre of the pipe is 100 below the level of mercury (specific gravity =13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm, determine the absolute pressure of the oil in the pipe. [16]

5.a) Discuss the principle, construction and working of Bubbler liquid level measurement with a neat diagram.
b) The internal diameter of the tapered metering glass tube of a Rota meter at the bottom of its range is 15 mm. The float is made of aluminium (relative density = 2.6) and has a volume of $550mm^3$, an effective diameter of 10 mm and vertical range of movement of 200 mm. Assuming a 5^o included taper angle for the tube and C_d as unity, calculate the range of flow which can be measured using a liquid of relative density 0.8. [16]

6.a) State the characteristics of resistance wire strain gauges.
b) Explain the features and operation of strain-gauge torsion meter with a neat sketch. [16]

7.a) Define the following terms
i) humidity ratio ii) dry & wet bulb temperature
iii) dew point iv) relative humidity.
b) Describe the working principle of a sling Psychrometer used for the measurement of relative humidity with a neat sketch. State its limitations. [16]

8.a) Distinguish between open loop and closed loop control systems.
b) Draw the block diagram for speed control system and explain the function of each component of it. [16]

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Code No: RR220305 | RR | SET-2

B.Tech II Year - II Semester Examinations, April/May-2012
INSTRUMENTATION AND CONTROL SYSTEMS
(MECHANICAL ENGINEERING)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

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1. Explain with diagram the operations of a DC and an AC tachogenerator. What are the reasons of their range limitations? Where are they commonly used? [16]

2.a) Describe the working principle of U-tube manometer with a neat sketch.
b) A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and right-limb is open to the atmosphere. The centre of the pipe is 100 below the level of mercury (specific gravity =13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm, determine the absolute pressure of the oil in the pipe. [16]

3.a) Discuss the principle, construction and working of Bubbler liquid level measurement with a neat diagram.
b) The internal diameter of the tapered metering glass tube of a Rota meter at the bottom of its range is 15 mm. The float is made of aluminium (relative density = 2.6) and has a volume of 550mm^3, an effective diameter of 10 mm and vertical range of movement of 200 mm. Assuming a 5^o included taper angle for the tube and C_d as unity, calculate the range of flow which can be measured using a liquid of relative density 0.8. [16]

4.a) State the characteristics of resistance wire strain gauges.
b) Explain the features and operation of strain-gauge torsion meter with a neat sketch. [16]

5.a) Define the following terms
i) humidity ratio ii) dry & wet bulb temperature
iii) dew point iv) relative humidity.
b) Describe the working principle of a sling Psychrometer used for the measurement of relative humidity with a neat sketch. State its limitations. [16]

6.a) Distinguish between open loop and closed loop control systems.
b) Draw the block diagram for speed control system and explain the function of each component of it. [16]

7. Draw a schematic diagram of a pressure gauge for measurement of pressure of a fluid. Draw a generalized block diagram of the system. Explain the function of each block. [16]

8.a) What is a linear variable differential transformer? Explain its construction and working principle with a neat diagram.
b) Explain construction and working of Bimetallic thermometer with a neat sketch and state its advantages and limitations. [16]

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Code No: RR220305 | RR | SET-3

B.Tech II Year - II Semester Examinations, April/May-2012
INSTRUMENTATION AND CONTROL SYSTEMS
(MECHANICAL ENGINEERING)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

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1.a) Discuss the principle, construction and working of Bubbler liquid level measurement with a neat diagram.

b) The internal diameter of the tapered metering glass tube of a Rota meter at the bottom of its range is 15 mm. The float is made of aluminium (relative density = 2.6) and has a volume of 550mm^3, an effective diameter of 10 mm and vertical range of movement of 200 mm. Assuming a 5^o included taper angle for the tube and C_d as unity, calculate the range of flow which can be measured using a liquid of relative density 0.8. [16]

2.a) State the characteristics of resistance wire strain gauges.

b) Explain the features and operation of strain-gauge torsion meter with a neat sketch. [16]

3.a) Define the following terms
i) humidity ratio ii) dry & wet bulb temperature
iii) dew point iv) relative humidity.

b) Describe the working principle of a sling Psychrometer used for the measurement of relative humidity with a neat sketch. State its limitations. [16]

4.a) Distinguish between open loop and closed loop control systems.

b) Draw the block diagram for speed control system and explain the function of each component of it. [16]

5. Draw a schematic diagram of a pressure gauge for measurement of pressure of a fluid. Draw a generalized block diagram of the system. Explain the function of each block. [16]

6.a) What is a linear variable differential transformer? Explain its construction and working principle with a neat diagram.

b) Explain construction and working of Bimetallic thermometer with a neat sketch and state its advantages and limitations. [16]

7. Explain with diagram the operations of a DC and an AC tachogenerator. What are the reasons of their range limitations? Where are they commonly used? [16]

8.a) Describe the working principle of U-tube manometer with a neat sketch.

b) A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and right-limb is open to the atmosphere. The centre of the pipe is 100 below the level of mercury (specific gravity =13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm, determine the absolute pressure of the oil in the pipe. [16]

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Code No: RR220305 | RR | SET-4

B.Tech II Year - II Semester Examinations, April/May-2012
INSTRUMENTATION AND CONTROL SYSTEMS
(MECHANICAL ENGINEERING)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks

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1.a) Define the following terms
i) humidity ratio ii) dry & wet bulb temperature
iii) dew point iv) relative humidity.
b) Describe the working principle of a sling Psychrometer used for the measurement of relative humidity with a neat sketch. State its limitations. [16]

2.a) Distinguish between open loop and closed loop control systems.
b) Draw the block diagram for speed control system and explain the function of each component of it. [16]

3. Draw a schematic diagram of a pressure gauge for measurement of pressure of a fluid. Draw a generalized block diagram of the system. Explain the function of each block. [16]

4.a) What is a linear variable differential transformer? Explain its construction and working principle with a neat diagram.
b) Explain construction and working of Bimetallic thermometer with a neat sketch and state its advantages and limitations. [16]

5. Explain with diagram the operations of a DC and an AC tachogenerator. What are the reasons of their range limitations? Where are they commonly used? [16]

6.a) Describe the working principle of U-tube manometer with a neat sketch.
b) A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and right-limb is open to the atmosphere. The centre of the pipe is 100 below the level of mercury (specific gravity =13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm, determine the absolute pressure of the oil in the pipe. [16]

7.a) Discuss the principle, construction and working of Bubbler liquid level measurement with a neat diagram.
b) The internal diameter of the tapered metering glass tube of a Rota meter at the bottom of its range is 15 mm. The float is made of aluminium (relative density = 2.6) and has a volume of 550mm^3, an effective diameter of 10 mm and vertical range of movement of 200 mm. Assuming a 5^o included taper angle for the tube and C_d as unity, calculate the range of flow which can be measured using a liquid of relative density 0.8. [16]

8.a) State the characteristics of resistance wire strain gauges.
b) Explain the features and operation of strain-gauge torsion meter with a neat sketch. [16]

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