Code No: RR212201 **RR** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
PRIME MOVERS AND MECHANICAL MEASUREMENTS
Instrumentation And Control Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the working principle of variable reluctance instrument for force measurement.
   (b) With a neat diagram, explain the working of reluctance accelerometer. [8+8]
2. (a) Derive the equation for the work done by the impeller of a centrifugal pump.
   (b) A centrifugal pump delivers water against a net head of 10m at a speed of 1000 rpm. The vanes are curved backward and make an angle of 30^0.
   The impeller outside diameter is 30 cm and has a width of 5 cm at the outlet. Determine the discharge if manometric efficiency is 95%. [6+10]
3. (a) Explain briefly why in multistage impulse turbines the first stage is often compounded for velocity and remaining having single row wheels.
   (b) For a stage of impulse turbine with single acting wheel and equiangular blades, the nozzle angle is 20^0. The velocity coefficient for the blades is 0.83. What is the maximum blade efficiency? If the blade efficiency is 90% of maximum value, what are the possible ratios of blade speed to steam speed in both cases? [6+10]
4. (a) Explain how you apply momentum equation to find the force exerted on a curved fixed plate by a jet of fluid striking at the center.
   (b) A stationary curved plate deflects a 10 cm diameter water jet through an angle of 120^0 in the horizontal plane. Calculate the force acting on the plate if the velocity of the jet is 15m/ sec. [6+10]
5. (a) Differentiate between gas turbine and steam turbine.
   (b) What are different applications of gas turbine? [8+8]
6. (a) Sketch the schematic arrangement of an oscilloscope for frequency and phase measurements and explain its working principle.
   (b) An oscilloscope displays a sine wave and the distance between the first and fourth peaks is found to be 5.4cm. If the time base setting is 20 x 10^{-03} make calculations for the periodic time and frequency of the sine wave. [8+8]
7. (a) Discuss the merits and demerits of surface condensers over jet condensers.
   (b) Define the term vacuum efficiency applied to condenser. Discuss the factors which affect the vacuum efficiency of a condenser. [8+8]
8. Explain with neat sketches the principle differences between the measuring devices used for Translational, Relational and Angular Velocity measuring devices. [16]

Code No: RR212201 **RR** **Set No. 2**

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Code No: RR212201 **RR** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
PRIME MOVERS AND MECHANICAL MEASUREMENTS
Instrumentation And Control Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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   (b) An oscilloscope displays a sine wave and the distance between the first and fourth peaks is found to be 5.4cm. If the time base setting is 20 x 10^{-03} make calculations for the periodic time and frequency of the sine wave. [8+8]
2. (a) Derive the equation for the work done by the impeller of a centrifugal pump.
   (b) A centrifugal pump delivers water against a net head of 10m at a speed of 1000 rpm. The vanes are curved backward and make an angle of 30^0.
   The impeller outside diameter is 30 cm and has a width of 5 cm at the outlet. Determine the discharge if manometric efficiency is 95%. [6+10]
3. (a) Explain the working principle of variable reluctance instrument for force measurement.
   (b) With a neat diagram, explain the working of reluctance accelerometer. [8+8]
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   (b) A stationary curved plate deflects a 10 cm diameter water jet through an angle of 120^0 in the horizontal plane. Calculate the force acting on the plate if the velocity of the jet is 15m/ sec. [6+10]
8. (a) Differentiate between gas turbine and steam turbine.
   (b) What are different applications of gas turbine? [8+8]

Code No: RR212201 **RR** **Set No. 4**

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Code No: RR212201 **RR** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
PRIME MOVERS AND MECHANICAL MEASUREMENTS
Instrumentation And Control Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Discuss the merits and demerits of surface condensers over jet condensers.
   (b) Define the term vacuum efficiency applied to condenser. Discuss the factors which affect the vacuum efficiency of a condenser. [8+8]

2. (a) Derive the equation for the work done by the impeller of a centrifugal pump.
   (b) A centrifugal pump delivers water against a net head of 10m at a speed of 1000 rpm. The vanes are curved backward and make an angle of 30^0. The impeller outside diameter is 30 cm and has a width of 5 cm at the outlet. Determine the discharge if manometric efficiency is 95%. [6+10]

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Code No: RR212201 **RR** **Set No. 1**

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Code No: RR212201 **RR** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
PRIME MOVERS AND MECHANICAL MEASUREMENTS
Instrumentation And Control Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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