SE/III/PROD/Fluid Mech & Fluid Power PROD/27/11/15

QP Code : 5109

(3 Hours) [Total Marks : 80

N.B. : (1) Question No.1 is compulsory.
    (2) Attempt any 3 questions from remaining five questions.
    (3) Assume suitable data if necessary and state the same.

1. Write short notes on the following (any four) :   20
    (a)   Bulk Modulus and compressibility
    (b)   Properties of Manoetric fluid
    (c)   Navier stroke's equation for steady incompressible fluid in cartesian coordinate system. muADDA.com
    (d)   Check valve and its application
    (e)   Stream function and velocity function.

2. (a) Determine the power required to run a 300mm diameter shaft at 400 rpm in   8
      journals with uniform oil of thickness 1mm. Two bearings of 300mm width
      are used to support the shaft. The dynamic viscosity of oil is 0.03 N.S./m².
  (b) Enumerate relative merits and demerits of hydraulic and Pneumatic systems.   6
  (c) State different types of hydraulic cylinders and explain one of them in detail.   6

3. (a) State the following :   6
        (i)   Pascal's Law and its application
        (ii)   Hydrostatic Law and its application
        (iii)   Bernoulli's equation and its application.
  (b) Derive an expression for total pressure and centre of pressure for a fully   8
      submerged inclined Lamina.
  (c) Explain with neat sketch the working of pressure relief valve.   6

4. (a) Explain with neat sketch the operation of external gear pump. Draw   8
      performance characterstics of pump. muADDA.com
  (b) Explain different types of flow with examples.   6
  (c) A horizontal venturimeter with inlet diameter 200mm and throat diameter   6
      100mm is used to measure the flow of water. The pressure at inlet is
      0.18N/mm² and vacuum pressure is 280mm of mercury at throat. Find ther
      rate of flow. Take $C_d = 0.98$.

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5. (a) Explain with neat sketch along with ISO symbol the working of any one of   8
these valves unloading valve or pressure reducing valve.

   (b) A viscous flow is taking place in a pipe of 120mm diameter. The maximum   6
velocity is 2.4m/s. Find the mean velocity and the radius at which it occurs.
Also calculate the velocity at 40mm from the wall.

   (c) Sketch inverted U-tube manometer and obtain manometric equation for   6
the same.

6. (a) Draw any of the following two circuits. (No explanation required)   6
   (i)   Meter in circuit
   (ii) Meter out circuit
   (iii) Transverse and feed circuit
   (iv) Sequence circuit.

   (b) Write short notes on (any three)   12
   (i)   Formula for flow of fluids arranged in series and parallel with
         neat sketches considering major and minor losses.
   (ii) Conditions of equilibrium for floating bodies.
   (iii) Buoyancy and metacentre
   (iv) Reynold's Number.

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