[4959]-1049

B.E. (Mechanical)
DESIGN OF PUMPS, BLOWERS & COMPRESSORS
(2012 Course) (Elective-IV) (End Sem.) (Semester-II) (402050 C)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Solve Q1 or Q2; Q3 or Q4; Q5 or Q6; Q7 or Q8; Q9 or Q10.*
2) *Answers for questions should be written in one single answer sheet only.*
3) *Figures to the right indicate full marks.*
4) *Neat figures should be drawn, wherever necessary.*
5) *Use of electronic pocket calculator is allowed.*
6) *Assume suitable data, if necessary.*

Q1) a)   Write a short note on stage "velocity triangles".   **[5]**

   b)   Write a short note on "Dimensional parameters".   **[5]**

<div align="center">OR</div>

Q2) a)   Explain the different applications of compressors, fans and blowers.

   [5]

   b)   Explain the Basic Equation of Energy Transfer between fluid and rotor.

   [5]

Q3) a)   What is slip? Explain the concept of negative slip.   **[5]**

   b)   Explain Air vessel in "Reciprocating Pumps".   **[5]**

<div align="center">OR</div>

Q4) a)   Explain construction and working of a "Reciprocating pump" with neat
      sketch.   **[5]**

   b)   Explain "Indicator Diagram" in reciprocating pumps.   **[5]**

Q5) a)   Discuss the various "Applications of Fans and Blowers".   **[8]**

   b)   Explain different criterias for "selection of fan s and blowers".   **[8]**

<div align="center">OR</div>

Q6) a) How does the dust erosion of centrifugal impeller occurs? What is its effect on the performance. **[8]**

b) Explain the function of an "Aerofoil" and discuss characteristic curves of an "Aerofoil". **[8]**

Q7) a) Explain different steps involved in designing of "Centrifugal Blowers". **[8]**

b) Write a short note on "Design procedure, selection & optimization of blowers". **[8]**

OR

Q8) a) Explain performance of "Axial fans" with neat graphs. **[8]**

b) Explain the different "fan stage parameters" with usual notations. **[8]**

Q9) a) Explain with neat sketch working of centrifugal compressor". **[8]**

b) A centrifugal compressor takes air at 01 bar and 20°C and delivers with total head pressure ratio of 03 bar at the rate of 20 kg/min. The air velocity at the inlet is 60m/s. The isentropic efficiency of the compressor is 70%. Determine: **[10]**

   i) The total head temp. of air at the exit of compressor and

   ii) B.P. required to run the compressor assuming the mechanical efficiency as equal to 95%.

OR

Q10) a) Explain in details "Performance characteristic curves of An Axial Flow Compressor". **[8]**

b) A centrifugal compressor running at 20,000 rpm takes air at 17°C. Using the following data, find the following parameters. **[10]**

   i) Temperature rise of air passing through the compressor.

   ii) The static pressure ratio.

   Take ϕs(slip factor) = 0.80; Isentropic efficiency (η Isentropic) = 0.70; outer diameter of the Impeller = 50cm. Assume the absolute velocity of Air Entering and leaving the compressor are same.

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