

Total No. of Questions :10]

SEAT No. :

**P3681**

[Total No. of Pages : 2

**[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]**

OR

**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]**

OR

**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]**

OR

**P.T.O.**

- 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  $\phi_s$ (slip factor) = 0.80; Isentropic efficiency ( $\eta$  Isentropic) = 0.70; outer diameter of the Impeller = 50cm. Assume the absolute velocity of Air Entering and leaving the compressor are same.

