Q.P. Code: 25534

Time: 3 Hours **Marks: 80**

- Question No. 1 is compulsory.
- Attempt any three questions from the remaining.
- Assumption made should be clearly stated.
- Design Data Book by PSG, Mahadevan , Kale & Khandare are permitted to use.

Q.1 **Answer any four** **20**

(a) Draw flow chart for design methodology and explain with example.

(b) State the importance of multispeed gear box.

(c) Write the different types of piston rings and its function.

(d) How to select the types of blade for centrifugal pump. Number of blades depends on which parameters.

(e) What are the advantages of multifall system in hoisting mechanism?

Q.2 (a) What is importance of bend in rope design also state function of compensating pulley? **5**

(b) For the specification of an EOT Crane , **15**

Application - Class II

Load to be Lifted - 100 KN

Hoisting speed - 10m/min

Maximum Lift - 8m

I. Select suitable hook and check at critical cross section.

II. Design cross piece based on bending criteria.

III. Design shackle plate.

Q.3 (a) Write advantages and disadvantages of Belt conveyor system. 5

(b) The specification of belt conveyor system are, 15

Capacity	: 300TPH
Material to be conveyed	: Lime Stone
Inclination	:12 degree
Lump size	: 80mm
Centre to Centre distance	: 50m

(Assume troughing angle 25 degree)

I. Design conveyor belt.

II. Find motor capacity.

Q.4 (a) What are different types of stresses induced in liner? State the requirements of liner material. 5

(b) Design following components of single cylinder, four stroke , water cooled Petrol Engine to develop 40KW at a speed of 2500rpm by making suitable assumption and neat sketches. Assume Compression Ratio as 7.5 15

1. Cylinder, 2. Liner, 3. Cylinder Head , 4. Stud.

Q.5 (a) What is water hammer in case of centrifugal pump, how to avoid it. 5

Q.5 (b) The specifications for the Gear Pump are, 15

Discharge- 40 LPM , Pressure- 50 bar

By making suitable assumption,

I. Select suitable standard Motor.

II. Design gear and check for bending failure, dynamic load and pitting

III. Find the resultant force acting on the heavily loaded shaft..

Q.6 (a) What are the different laws can be used to decide the rpm value of different steps in machine tool gear box. Explain any one law with example. 5

(b) A 9 speed Machine Tool Gear Box is to be designed, for following Specification: 15

Minimum speed N_{min}= 100 rpm, N_{max} = 630 rpm, Progression ratio Φ = 1.26

I. Draw structural diagrams and select the best one.

II. Draw ray diagram and speed chart for selected structural formula.

III. Determine the number of teeth on each gear.

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