

BE - Mech - Sem - VIII (CBSGS)

20 NOV 2018



(Hours 3)

[Total 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

- (a) Draw flow chart for design methodology and explain with example. 5
- (b) What is mean by 6 X 37 rope in hoisting mechanism, elaborate with neat sketch. 5
- (c) List different types of piston rings and their functions. 5
- (d) Draw a neat sketch of centrifugal pump and explain its principle of working. 5
- (e) List the various laws of speed range distribution, explain arithmetic progression law with example. 5

Q.2 (a) What is cavitation in centrifugal pump? How to avoid it. 5

- (b) For the specification of an EOT Crane ,
- Application - Class II
- Load to be Lifted - 100 KN
- Hoisting speed - 10 m/min
- Maximum Lift - 5 m
- i. Design a 6 X 37 type of rope and find its life. 8
- ii. Design hook and check it at most critical cross section. 8
- iii. Select suitable motor for hoisting. 4

Q.3 (a) State the advantages of multi fall pulley systems. 4

- (b) Belt conveyor system is to be designed for the following specifications:
- Material conveyed up : Coal
- Capacity : 200 TPH
- Lump size : 80mm
- Horizontal distance : 20m
- Vertical distance : 3m
- Troughing angle : 15 degree
- i. Design conveyor belt. 8
- ii. Select suitable motor for conveyor. 4
- iii. Design the upper roller and bottom roller. 4

TURN OVER



- Q.4 Design following components of single cylinder, two stroke, and water cooled Petrol Engine to develop 40 KW at a speed of 1000rpm by making suitable assumption and neat sketches. Assume Compression Ratio as 7.
- i. Find the standard bore and length of a cylinder. 5
  - ii. Calculate the design pressure considering explosion ratio as 3.25 and FOS as 1.3. 5
  - iii. Design connecting rod and check it for bending. 10
- Q.5 (a) It is required to design a 2 X 2 machine tool gear box with following specification. 10  
 $N_{min} = 100\text{rpm}$ ,  $N_{motor} = 960\text{ rpm}$ , GP ratio = 1.26
- i. Draw structural diagrams,
  - ii. Draw ray diagram and speed chart,
  - iii. Find the number of teeth of each gear.
- (b) A centrifugal pump is required to design for the total manometric head of 20 m and discharge of 900LPM of water at room temperature.
- i) Find the inlet and outlet diameter of an Impeller of the centrifugal pump. 6  
 (Draw neat sketch of impeller and assume  $D_2 = 2D_1$ )
  - ii) Find the inlet and outlet diameter of pipes. 4
- Q.6 A Gear Pump required to deliver 75LPM of SAE20 oil at a pressure of 120 bar. By making suitable assumption,
- i. Select suitable standard Motor. 3
  - ii. Select suitable flexible bush pin coupling. 3
  - iii. Design gear and check for bending failure. 10
  - iv. Design casing of the gear pump. 4