BE Sem VIII Mechanical Engineering Choice Based Nov-202

21/11/2022

(3 Hours) **Total Marks: 80**

N.B. 1) **Question No. 1 is compulsory**
2) Solve **Any Three** from remaining **Five** questions.
3) Use of standard data book like PSG, Mahadevan and Kale Khandare is permitted
4) Assume suitable data if necessary, giving justification

Q1 Answer any **Four** from the following

a) What is bend in rope pulley system of hoisting mechanism? State the effect of bend on the rope life. 5

b) Explain the optimum design concept in system design. 5

c) Why cavitation occurs in a centrifugal pump? State the remedial measures for the same. 5

d) List the different types of piston rings and their functions. 5

e) Why geometric progression is preferred for the speed selection in the multi speed gear box design? 5

Q2 a) Explain the rope construction in hoisting rope with example. 5

b) Select a suitable hook with trapezoidal cross section and check it at most critical cross section for design hoisting load of 50 kN. Also select the suitable thrust bearing for it. 15

Q3 a) State the fanning effect in the belt conveyor system. 5

b) Determine the width of the conveyor belt and motor capacity for the following specification 15

Material to be conveyed	: Coal
Capacity	: 150 TPH
Inclination	: 10 degree
Centre to Centre distance	: 60 m

Q4 a) Explain the ovality of the piston with neat sketch. 5

b) Determine bore diameter and design a piston for a 4-stroke, single cylinder, water cooled, vertical diesel engine with following specifications: 15

Indicated power = 20 kW
Speed = 1200 rpm
Compression Ratio = 14

Q5 a) Describe the working of the gear pump with neat sketch. 5

b) Design a volute casing for a centrifugal pump having impeller with outer diameter 320 mm and inner diameter 160 mm. The specifications for the pump are 15

Total manometric head: 20 m
Discharge: 900 LPM
Motor speed : 1440 rpm

Q6 a) A six speed gear box is to be designed for a machine tool with geometric progression ratio as 1.41 and N_{max} = 1440 rpm 20

i. Draw and Select suitable structural diagram.
ii. Draw a ray diagram and speed chart
iii. Determine the number of teeth on each gear
iv. Draw the deviation diagram
