I C06 / Lib / BE / Sem-VII / Mech / PLCM / 14/06/2024

Paper / Subject Code: 42879 / Product Lifecycle Management ILOC I

B.E / Sem-VII / Mechanical / May-2024

Date :- 14/06/2024

Duration: 3 Hours **Maximum Marks: 80**

N.B.: -

1. Question No 1 is Compulsory
2. Solve any three questions from remaining questions
3. Assume suitable data if required and mention it clearly
4. Figures to right indicate full marks

Q1		Solve any four of following	
	[A]	With respect to Product Life Cycle Management explain opportunities to Globalization.	5
	[B]	Explain concept of organization and decomposition in Product design	5
	[C]	Explain importance of Product Data Management System	5
	[D]	Explain need for life cycle environmental strategies.	5
	[E]	How will you develop PLM vision and PLM Strategy	5
Q2	[A]	Explain useful life extension strategies with suitable example	10
	[B]	Explain general framework for LCCA	10
Q3	[A]	Explain various barriers to PDM implementation	10
	[B]	Explain concept of digital mock-up in detail	10
Q4	[A]	Provide financial justification for PDM implementation	10
	[B]	Explain phases of LCA in ISO standards	10
Q5	[A]	What do you mean by design for X? Explain choice of Design for X tools and their use in design process	10
	[B]	Explain various Product Life Cycle phases with suitable example	10
Q6		Write short notes on:-	
	[A]	Concurrent Engineering	10
	[B]	Modelling and Simulation in Product Design	10

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ICO6/Lib/BE/Sem-VII/Mech/MID/12/06/2024

Paper / Subject Code: 42876 / Machinery Diagnostics (DLOC- IV)

B.E | Sem-VII | Mechanical | May-2024

Date:-12/06/2024

Time: 3 hour

Max Marks: 80

Note: 1. Q1 is compulsory
2. Solve any three from remaining

Q1 **Solve any Four out of Six** 20

A. Explain the corrective measures for looseness?
B. Describe the four areas that should be incorporated in an industrial pump maintenance program.
C. Explain the Laser Doppler vibrometry (LDV) with diagram and Its Types.
D. Describe Windowing functions with diagram.
E. Differentiate the time and frequency domain analysis.
F. Describe the characteristic of cavitations experienced in Centrifugal pump.

Q2

A. What is the importance of choosing the correct sensor mounting location? How to decide the optimum sensor location in condition monitoring? 10
B. What are the advantages of vibration based condition monitoring? Write the steps involved in condition monitoring. 10

Q3

A. Explain the methods to diagnose the vibrations due to bearing faults? Also, Explain the Vibration Generated by Defective Rolling Bearings. 10
B. Describe the effect of bent shaft on machine vibration? What is the monitoring frequency for bent shaft? 10

Q4

A. What is the importance of operating speed in machinery fault diagnosis using vibration analysis? Also discuss the importance of sidebands. 10
B. Explain the four classes of Fourier transform with graph. 10

Q5

A. Explain the working principle of the following: displacement, velocity, acceleration, and force measurement, laser based sensors, leaser vibrometer. 10
B. Explicate the significance of continuous Pump Vibration Monitoring? 10

Q6

A. Explain the reasons for looseness and its effects of mechanical looseness? 10
B. Describe the different faults associated with a gearbox and methods to reduce the gearbox problems. 10

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ICOE/Lib/BE/Sem VII/Mech/RES/10/06/2024

Paper / Subject Code: 42874 / Renewable Energy Systems (DLOC - III)

B.E/Sem-VII/Mechanical/May-2024 Date:-10/06/2024

Duration: 3hrs [Max Marks:80]

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	[20]
	a	Discuss the different methods of hydrogen production and storage	5
	b	State the advantages of concentrating collector over flat plate collector	5
	c	State the factors considered for site selection to install wind power plant	5
	d	Describe the current scenario of non-conventional energy sources of the India	5
	e	Discuss the different methods of hydrogen production and storage	5
2	a	Describe the working principle of natural circulation solar water heater system with a neat sketch.	[8]
	b	Discuss the factor which affects the efficiency and life cycle of solar PV cell	[8]
	c	Calculate the sunset hour angle and day length at a location, latitude 35 °N on March 20	[04]
3	a	Following data is given for a family biogas digester;	[08]
		C.V. of methane = 26 MJ/m^3, Burner efficiency = 65 %, Number of cows = 6, Retention period = 28 days, Temperature of fermentation = 30^{0}C, Day matter collected/cow/day = 2.5 kg, Density of matter in the fluid in the digester = 50 kg/m^3 Biogas yield=0.25 m^3/ kg of dry input, Methane production in Biogas = 0.8.	
		Determine volume of Digester and power available from biogas digester.	
	b	Describe the working of a solar pond with a help of neat sketch.	[08]
	c	Discuss the I-V characteristics of a solar PV cell	[04]

4 a A solar photovoltaic plant system installation is expected to minimize the plant's annual energy bill by Rs. 18 lacs. If the capital cost of new solar photovoltaic plant installation is Rs. 92 lacs and the annual operating and maintenance cost is 5 lacs. Determine, [08]

(a)The expected payback period for the project

(b)The initial rate of return / return on investment

b Illustrate the working principle of Open and Closed OTEC system with the neat sketch. [08]

c Differentiate between horizontal axis wind turbine and vertical axis wind turbine. [04]

5 a A propeller type horizontal wind turbine having wind characteristics, speed of wind is 15 m/s at 1 standard atmospheric pressure and 20 °C. The rotor has diameter of 110 m and its operating speed is 35 rpm at maximum efficiency. Determine: [08]

a) the total power density in the wind

b) the maximum obtainable power density assuming η=40 %

c) the torque and axial thrust

b Describe the working principle of solar photovoltaic system [06]

c Describe the working principle of liquid dominated geothermal power plant [06]

6 a Estimate the monthly average of daily global radiation on a horizontal surface at Baroda, 22° N, 73 ° 10' E during December. If the average sunshine hour/day is 9.5, a = 0.32, b = 0.45. (Assume 15 Dec., Isc =1367 W/m^2) [10]

b Illustrate the working principle of KVIC biogas plant with the neat sketch [10]

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ICOE/Lib/BE/Sem-VII/Mech/LSCM/06/06/2024

Paper / Subject Code: 42872 / Logistics and Supply Clain Management

BE/Sem-VII/Mech/May-June-2024

06/06/2024

Time: 3 Hours Marks: 80

Note :

- Question No.1 is compulsory.
- Solve any three questions from the remaining five questions.
- Figure to the right indicates full marks.
- Assume suitable data wherever required, but justify the same.

			Marks
Q. 1		Solve ANY FOUR questions from following. (Each question carries 5 marks)	
	a)	List the six supply chain drivers and show their effects on Supply Chain Management with the help of a neat sketch.	
	b)	Define SCOR and show the framework focusing on five areas of SCOR.	
	c)	Derive the EOQ for Basic Deterministic model used in Inventory Management.	
	d)	Explain the concept of Cross-docking with help of suitable case study.	
	e)	Define CSR and explain the initiatives and actions done under CSR.	
Q. 2	a)	Describe Supply Chain Risk Management (SCRM) and explain the different categories of Supply Chain Risks in detail.	10
	b)	Define outsourcing, list its types and explain and compare the 3PL and 4PL concepts in supply chain.	10
Q. 3	a)	Explain Value Stream mapping using a suitable example.	5
	b)	Explain about the resilient supply chain and discuss its benefits.	5
	c)	Explain the difference between Minimum Order Quantity (MOQ), and Economic Order Quantity (EOQ) using suitable examples.	10
Q. 4	a)	A Sugar Producer purchases sugar cane from suppliers every year, for producing 8,000 tons of sugar. He orders the raw materials at a cost of Rs. 4500 per ton each time to fulfill the demand. One of the supplier offers a discounted price of Rs. 4200 per ton, if the sugar producer will place an order of 800 tons or more. Should the producer consider the offer and if so, how much quantity should he purchase if the inventory carrying cost is given as 8% of the unit cost price per year and ordering cost is Rs.1200 per order?	10
	b)	Explain supply chain sustainability index measurement with the help of a case study.	5
	c)	Define bullwhip effect in Supply chain and list down its causes and remedies.	5
Q. 5	a)	List different types of warehousing and explain the different warehouse strategies.	5
	b)	What are the key issues involved in the Supply Chain Management?	5
	c)	Explain any four different methods of selective inventory control like ABC Analysis, etc.	10
Q. 6	a)	Explain the challenges in establishing Global Supply Chain and list the objectives of Global Supply Chain Management.	10
	b)	Explain the different models of Transportation used in SCM with the help of suitable examples.	10

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ICOE/Libl/BE/SemVII/mech/DMS/04/06/2024

Paper / Subject Code: 42871 / Design of Mechanical Systems

BE/Sem-VII/Mech/June-2024

04/06/2024

Time: 3 Hours | Marks: 80

- Question 1 is compulsory.
- Attempt any three questions from remaining.
- Design data book PSG, Mahadevan, Kale and Khandare are permitted to use.

Q1. Answer any four from the following.

a. State the types of gear tooth failure and corrective measure for it. 5

b. Explain why an I – section with Ixx ≤ 4 Iyy is selected for connecting rods of an I.C. Engine? 5

c. Why cleaning of belt is necessary in belt conveyor? list down different types of cleaners. 5

d. Give the basic constructional details of different types ropes used in EOT crane. And what do you understand by 6 × 37 rope? 5

e. Explain Methodology for mechanical system design with suitable example? 5

Q2. A pair of bevel gear is required to transmit 8 KW power from a pinion shaft rotating at 400 rpm with reduction ratio 3.5. The shaft angle is 90 degree and drive is subjected to moderate shock and operates at 12 hrs/day. Design gear pair in strength and check for wear, also perform arm design. 20

Q3. The following specification refers to an EOT crane.
Application - Class II
load to be lifted - 80 KN
Hoisting Speed - 6 m/min
Maximum lift – 10 m

a. Select a standard hook, material and design stresses induced at the most critical section. 5

b. Select suitable type and size of the wire rope for an expected life of 12 months. 5

c. Design the pulley axle and select suitable bearing. 5

d. Design the rope drum. 5

Q4. The specification of belt conveyor system are, 5
Capacity = 200 TPH
Material to be conveyed = Lime stone.
Maximum lump size = 90 mm.
Inclination = 12°.
Center to centre distance = 100 m.

a. Find motor capacity. 5

b. Design conveyor belt. 5

c. Check the belt conveyor system for arresting mechanism. 5

d. Determine the number of troughing and returning idlers required for the conveyor system. 5

Q5 a.	Distinguish between gear pump and the centrifugal pump.		5
b.	A centrifugal pump directly coupled to a motor is required to deliver 1000 LPM of water at 30°C against a total head of 25 m.		15
	I.	Select the type of motor, speed.	
	II.	Determine the impeller diameter, inlet and outlet vane angles and no. of vanes.	
	III.	Design the volute casing.	
Q6	Design following components of single cylinder, two stroke and water-cooled Petrol Engine to develop 40 KW at a speed of 1000 rpm by making suitable assumption and neat sketches. Assume Compression Ratio as 7.		
a.	Determine the design pressure considering explosion ratio 3.25 and FOS as 1.3.		5
b.	Determine the standard bore and length of cylinder.		5
c.	Design connecting rod and check it for bending.		10