



Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058



END SEM

May 2018

Date: 21.05.2018

Program: B.Tech Mechanical Engineering

Duration: 3 Hours

Course code: BTM808

Maximum Marks: 100

Name of the Course: Supply Chain Management

Semester: VIII

Instructions:

- Question no. 1 is compulsory.
- Attempt any four out of six.
- Use of Scientific calculator is allowed.
- Answers to all sub questions should be grouped together.
- Assume suitable data if necessary justify the same and state the assumptions clearly.
- Draw Flow Chart/Pin Diagrams Wherever Necessary.

Q. No.		Marks	CO No.	Mo. No.
Q1	(a) Write any four requirements of logistic information system.	04	01	04
	(b) What is Bullwhip effect? Explain.	04	01	06
	(c) Write down four functions of intermediaries in distribution channel.	04	01	04
	(d) Write at least three of the strategic role played by transportation in logistic system.	04	01	05
	(e) What are four of the important inventory decisions?	04	01	03
Q2	(a) What is the definition of supply chain management? Explain the concept.	10	02	01
	(b) What is 3PL? How does it differ from 4PL? Explain their importance for global logistics.	10	02	04
Q3	For the following Data: (a) Find EOQ if Monthly Consumption = 10000 Units Cost Price = 125 Rs. per unit Inventory Carrying Cost = 20% per year Ordering Cost = Rs. 2400 per year	05	02	03
	Find total cost for the same (b) What should the company do if the supplier offers discount of 2% on purchase of minimum 20000 units per order and discount of 5% for minimum purchase of 40000 units per order?	05	02	03
	(c) "Zero failure is something all supply chain must strive for". Take an example of Mumbai's Dabbawalas, and justify the	10	04	05

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Q4	A specialty chemical company ABC is considering expanding its operations into Brazil, when five companies dominate the consumption of specialty chemicals. What sort of distribution network should this Company utilize?	20	03	04																																																											
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Q7	Write Short Notes: (any Four) (a)CPFR (b)Reverse Logistics (c)SCM score Modeling (d)Routing Models (e)VMI VS CMI	05 05 05 05 05	01 02 02 01 01	02 07 07 07 03																																																											



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End Semester Exam
May 2018



Max. Marks: 100

Class: Final Year B.Tech

Semester: VIII

Program: Mechanical Engineering

Name of the Course: Design of Mechanical Systems

Course Code : BTM801

Q. P. Code:

Duration: 03 hr

Instructions:

1. Question No. 1 is compulsory. Attempt any four out of remaining six questions.
2. Answer to all sub questions should be grouped together.
3. Assume suitable data if necessary.
4. Use of PSG data book is permitted. Refer Annexure 1 for additional design data.

Question No		Maximum Marks	Course Outcome Number	Module No
Q1 (a)	Describe in brief the classification of material handling equipments. Name one example of each type.	4	1, 2	1
(b)	Sketch external and internal gear pumps and describe it's working.	4	1, 2	6
(c)	Explain the following terms: 1. Drive unit used for belt conveyors 2. Different resisting forces acting on the Conveyer belt	4	1	3
(d)	Explain the difference between the single and multiple pulley systems. Which type is used in EOT cranes and why?	4	1, 2	2
(e)	Give classification of pressure vessels in terms of their geometry, function and service.	4	1	7
Q2 (a)	Following are the specifications refer to an EOT crane: <ul style="list-style-type: none">• Class of Mechanism = M5 (equivalent to old standard class II)• Hook load = 70 kN• Height to which the load is raised = 8 m• Dead weight of Hoisting system = 3 kN• Braking time for hoist = 3 seconds• Hoisting velocity = 12 m/min• Number of rope falls = 4• Efficiency of pulley system = 0.94• Weight of trolley = 7 kN• Speed of trolley = 25 m/min• Trolley wheel and wheel axle diameters = 250 mm and 60 mm <ol style="list-style-type: none">i. Select suitable size of rope.ii. Design rope drum.	15	1, 2	2

	iii. Calculate power rating of electric motor to drive trolley.			
Q2 (b)	Sketch and explain the wire rope components.	5	1, 3	2
Q3 (a)	Why is priming necessary for centrifugal pump and not in reciprocating pump?	5	1, 4	4
(b)	Design a 25° troughing belt conveyor to transfer 175 tons/hour of iron ore through a horizontal distance of 80 m and vertical height of 20 m. The belt speed is to be limited to 2.5 m/s. Secondary resistance for belt wrapping around pulley (R_w) can be taken as 400N (total). Assuming suitable coefficient of rolling friction between belt and pulley and the angle of belt wrap around pulley. Design should include following: a. Belt width. b. Calculation of belt resistance and belt tension. c. Selection of belt fabric.	15	2	3
Q4 (a)	Give classification of pumps employed in engineering study. Select type of pump for following applications: (i) Pharmaceutical liquid solution, (ii) paint, (iii) household sewage, (iv) Crude from oil well platform. Justify your selection.	12	1, 4	4
(b)	Explain with the sketch, the working principle of diaphragm pump.	03	1, 2	4
(c)	State Material Handling Principals.	05	1, 2	1
Q5 (a)	Explain the different types of impellers and state practical application of each type.	05	1, 2	4
(b)	A centrifugal pump is to be designed to generate total head of 55 meters, The medium is water at 20° and discharge rate is 90 m ³ /hr. The pump is directly coupled to an electric motor. Determine power requirement and select suitable motor for the pump. Calculate the suction pipe diameter, impeller dimensions and number of vanes.	15	1, 2	5
Q6 (a)	Design a gear pump for following specifications: • Fluid to be pumped is automotive oil SAE 50 • Discharge is 140 liters/ min • Delivery pressure is 35 bar The pump is directly coupled to an electric motor. The design should include: gear size, suction and discharge pipe size, Shaft and key dimensions, housing wall thickness and power rating of electric motor.	15	3, 4	6
(b)	Explain alphanumeric codification system in detail and write the material code for following materials: • Copper ore • Salt	05	1, 4	1

	<ul style="list-style-type: none"> • Dry Sulphur • Ashes • Bauxite. 			
Q7 (a)	Define following terms used in the design of pressure vessels: <ol style="list-style-type: none"> 1. Design pressure 2. Design temperature 3. Corrosion allowance 4. Weld joint efficiency 5. Seismic load 	10	1, 3	7
(b)	Draw neat sketch of vertical cylindrical pressure vessel having hemispherical head and write the expression for calculating thickness for the same.	10	1, 3	7

Annexure I

(All symbols indicate their conventional meaning)

Impact factor for structural components of EOT crane (IS 3177)

Class	MI	MI2	MI3	MI4	MI5	MI6	MI7	MI8
Impact factor	1.06	1.12	1.18	1.25	1.32	1.40	1.50	1.50

Standard diameters of rope drum at the bottom of groove: 200, 250, 315, 400, 500, 630, 710, 800, 900, 1000, 1250 mm.

Some useful relationships for design of centrifugal pump:

$$\text{Suction pipe diameter, } D_s = \sqrt{\frac{4Q'}{\pi V_s} + d_n^2}$$

$$\text{where } Q' = (\text{leakage factor}) \times Q, \quad V_s = V_0 = V_c, \quad V = \sqrt{2gH}, \quad \epsilon = 0.023\sqrt{n_q}$$

$$\text{Inlet vane width, } b_1 = \frac{Q'}{\pi D_1 V_0}$$

$$\text{Outlet vane width, } b_2 = \frac{Q'}{\pi D_2 V_{m3}} \text{ where } V_{m3} = (0.8 \text{ to } 0.9) \times V_0$$

$$\text{Number of vanes, } z = 13 \frac{r_m}{r} \sin \beta_m$$

$$\tan \beta_1 = \frac{1.25V_0}{u_1}, \quad u_1 = \frac{\pi n D_1}{60}$$

Classification of Bulk Materials:

Material Characteristics	Description of characteristics with Typical Examples	Limits of Characteristics	Class
1. Lump size	Dusty material (cement)	"amax" upto 0.05 mm	A
	Powdered material (fine sand)	"amax" upto 0.05 to 0.50 mm	B
	Granular material (grain)	"amax" upto 0.5 to 10 mm	C

	Small sized lumpy (iron ore)	"amax" upto 10 to 60 mm	D
	Medium sized lumpy (chipped wood)	"amax" upto 60 to 200 mm	E
	Large lump materials (boulder)	"amax" upto 200 to 500 mm	F
	Especially large lump size	"amax" over 500 mm	G
2. Flowability	Very free flowing (cement, dry sand)	Angle of repose: 0°-20°	1
	Free flowing (whole grains)	Angle of repose: 20°-30°	2
	Average flowing (anthracite coal, clay)	Angle of repose: 30°-35°	3
	Average flowing (bituminous coal, ores, stone)	Angle of repose: 35°-40°	4
	Sluggish (wood chips, bagasse, foundry sand)	Angle of repose: >40°	5
3. Abrasiveness	Non-abrasive (grains)	-----	6
	Abrasive (alumina)	-----	7
	Very abrasive (ore, slag)	-----	8
	Very sharp (metal scraps)	Cuts belting of conveyors.	9
4. Bulk density	Light (saw, dust, peat, coke)	Upto 0.6 t/m ³	H
	Medium (wheat, coal, slag)	0.6 to 1.6 t/m ³	I
	Heavy (iron ore)	1.6 to 2.0 t/m ³	J
	Very heavy	2.0 to 4.0 t/m ³	K
5. Miscellaneous characteristics	Aerates and develops fluid	-----	L
	Contains explosive (or external) dust	-----	M
	Sticky	-----	N
	Contaminable, affecting use or saleability	-----	P
	Degradable, affecting use or saleability	-----	Q
	Gives off harmful fumes or dust	-----	R
	Highly corrosive	-----	S
	Mildly corrosive	-----	T
	Hygroscopic	-----	U
	Oils or chemicals present	May affect rubber products	W
	Packs under pressure	-----	X
	Very light and fluffy (or very high flowability and dusty)	May be swept by wind	Y
	Elevated temperature	-----	Z



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EndSem Exam

May 2018

Max. Marks:100

Class: B.tech Mech.

Name of the Course: CAD/CAM/CIM

Semester: VIII

Duration: 3hrs

Program: Mechanical Engg.

Course Code : BTM4802

Instructions:

1. Q.1 is Compulsory
2. Solve any five questions out of seven
3. Figures to the right indicates full marks
4. Support neat sketches wherever necessary
5. Assume suitable data wherever necessary

Question no.	Questions	Maxi. marks	Course outcome n
Q.1 (a)	What are the elements of Adaptive Control machining system? What are the various types of Adaptive Control systems? Also explain the advantages of the same	12	01
Q.1(b)	Write a C++ Program for Bezier Curve	08	04
Q.2 (a)	Develop a C++ program in terms of homogeneous coordinates for 3D transformations on object like triangle. Insert necessary comments wherever necessary. 1) Translation 2) Scaling 3) Rotation 4) Reflection	20	04
Q.3 (a)	Obtain transformation matrix for rotation about the line joining the points (0,0,0) and (1,1,1) with the angle of rotation 45 degree in counter clockwise sense.	10	03
Q.3(b)	Explain the following with neat sketches • Tool Length Compensation • Cutter Radius Compensation	10	01
Q.4(a)	Explain the Thread Cutting Cycle in CNC machines using an example?	04	01
Q.4(b)	Explain Painters Algorithm with neat sketches?	06	01

Q.4(c)	What is Feature Recognition? List the various methods? Explain any one with neat sketches?	10	01
Q.5(a)	Explain Cohen Sutherland Algorithm?	06	01
Q.5(b)	Write a complete APT part program to machine the profile of the geometry shown in the figure.no.1. The component is 5mm thick. The end mill is 10mm in diameter. Assume spindle speed as 1000 rpm and feed as 0.3 mm / rev.	06	
			02
	Figure-no.1		
Q.5(c)	Explain CAD-PDM-VR Integration with neat figures?	08	01
Q.6(a)	Explain Computer Aided Process Planning (CAPP) & its types?	10	01
Q.6(b)	Find the concatenated matrix, when a point P (x,y) is to be reflected about a line $y = mx+b$. (Note: The final matrix should be represented in terms of m.)	1	03
Q.7(a)	Write Short notes on (Any Two) a) Design for Assembly (DFA) b) Augmented Reality (AR) c) Engineering Data Management System (EDMS) d) Virtual Reality (VR)	10	01
Q.7(b)	Write Short notes on (Any Two) a) Computer Integrated Manufacturing (CIM) b) Group technology (GT) c) Computer Aided Quality Control(CAQC) d) Structured Query Language (SQL)	10	01



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END SEM EXAMINATION

Program: **B. Tech. in Mechanical Engineering**
Class: **Final Year B. Tech. (Mechanical)**
Course code: **BTM 811**
Course: **Power Plant Engineering**

Date: **May-2018**
Duration: **3 Hr.**
Max. Points: **100**
Semester: **VIII**

Instructions:

- Attempt **ANY 05** of the following questions.
- Draw **neat Process diagrams /T-s Diagrams/ Figures** etc.whenever necessary.
- Use **Graph paper** for Load curve & Load Duration curve.
- **Legible hand writing**, proper figures and tidy work carry weightage.
- Answers to the questions should be **Brief and Specific**.
- **Assume suitable data** whwherever found necessary and mention the same.

		Max. Points	CO No.	Module No.																				
Q 1	A) Draw: the Chronological daily Load Curve and Load Duration Curve from the following observation.	(10)	1,4	1																				
	<table border="1"><thead><tr><th>Time</th><th>Load, kW</th><th>Time</th><th>Load, kW</th></tr></thead><tbody><tr><td>6 am to 8 am</td><td>3000</td><td>5 pm to 6 pm</td><td>7000</td></tr><tr><td>8 am to 12 Noon</td><td>10000</td><td>6 pm to 9 pm</td><td>6000</td></tr><tr><td>12 Noon to 1 pm</td><td>5000</td><td>9 pm to 11 pm</td><td>6000</td></tr><tr><td>1 pm to 5 pm</td><td>10000</td><td>11 pm to 6 am</td><td>2000</td></tr></tbody></table>	Time	Load, kW	Time	Load, kW	6 am to 8 am	3000	5 pm to 6 pm	7000	8 am to 12 Noon	10000	6 pm to 9 pm	6000	12 Noon to 1 pm	5000	9 pm to 11 pm	6000	1 pm to 5 pm	10000	11 pm to 6 am	2000			
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12 Noon to 1 pm	5000	9 pm to 11 pm	6000																					
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	If the Reserve capacity in the station is 3000 kW, Evaluate: i) Load Factor ii) Plant Capacity Factor iii) Plant use Factor																							
	B) Explain: Different types of energy rates. Energy rates for Mumbai city electricity supply are lower for Tata Power than Reliance Energy. Analyze : Reasons for the difference applying your subject knowledge.	(10)	1,4	1																				
Q.2	A) Explain: Various types of Hydroelectric Power Plants.	(10)	2	2																				
	B) Explain: i) Hydrograph and Mass Curve ii) Elements of cost of a Hydroelectric Power Plant.	(10)	1,2	2																				

Q.3	A) Explain: Concept of Fluidized Bed Combustion and Describe: Working of Circulating Fluidised Bed (CFB) Combustor with neat sketch.	(10)	2	3
	B) Compare: Advantages of Diesel Power Plant over Gas Turbine Power Plants. Following parameters are noted for a performance test of a single cylinder four stroke diesel engine:- Brake load applied to drum of 1.8 m diameter is 196 N. Fuel consumption is 0.12 kg/min with calorific value of 41870 kJ/kg. Total amount of cooling water passing through the jacket is 540 kg with its inlet and outlet temperatures as 20 °C and 60 °C respectively. Total amount of air consumed is 6.1 kg/min. The exhaust gases having $C_p = 1.005 \text{ kJ/kg.K}$ leaving the engine cylinder at 300 °C are released to atmosphere at 20 °C. i) Evaluate: Brake Power and Thermal Efficiency of the engine. ii) Estimate: Heat Balance of the engine.	(10)	2,4	5
Q.4	A) Explain: Working, advantages and disadvantages of Pressurised Water Reactor (PWR) with a neat sketch.	(10)	2	4
	B) Explain: Criterion for classification and State: Types of Nuclear Power Plants based on these criterion. The rating of a Nuclear Power Plant for a submarine is 5 MW. Overall Thermal Efficiency is 30%. The fuel is U^{235} . Evaluate: Amount of Natural Uranium needed to generate this power if the average energy release per fission for this fuel is 190 MeV.	(10)	2,4	4
Q.5	A) Explain: Working, advantages and disadvantages of Modified Open Gas Turbine Cycle (OGTC) Plant with a neat sketch and T-s Diagram.	(10)	2	5
	B) Following particulars relate to a simple closed cycle gas turbine plant using air as the working medium. Compressor Inlet Temperature = 26°C, Air Pressure at Compressor inlet = 1 bar, Pressure Ratio = 5, Maximum Temperature = 870 °C, Compressor efficiency = 0.8, Turbine Efficiency = 0.84, Calorific value of Fuel = 41840 kJ/kg, Heater Loss = 10% of heating value, For working medium air, $C_p = 1.005 \text{ kJ/kg.K}$ and $\gamma = 1.4$. Evaluate: i) Thermal Efficiency of plant ii) Fuel-Air Ratio iii) Air Rate iv) Work Ratio and v) Specific Fuel Consumption.	(10)	2,4	5

Q.6	A) Explain: Difference between Combined Cycle Power Generation and Cogeneration. Explain: Working of Simple Gas Turbine Cycle and Single Pressure with neat process diagram, T-s and T-Q diagrams.	(10)	2	6
	B) Explain: Difference between Combined Cycle Power Generation and Combined Power Generation. Discuss: Combined Steam and Hydroelectric Power Plant operation, describing i) Factors for selection as Peak or Base Load Plant and ii) Advantages of combined operation.	(10)	2	6
Q.7	A) Explain: Various Methods to reduce/remove Sulphur from fuel used in Thermal (Steam/Diesel) Power Plants before its combustion.	(10)	3	7
	B) Explain: Various Methods of removal of H ₂ S and Oxides of Sulphur from exhaust/ flue gases of Thermal Power Plants produced after combustion of fuel.	(10)	3	7



Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2018



Max. Marks:100
Class: B.Tech(Mechanical)
Program: MECHANICAL ENGINEERING
Name of the Course: AUTOMOBILE ENGINEERING
Course Code : BTM 809

Duration: 3HR
Semester:VIII

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. Assume suitable data if necessary

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1	A. A vertical single cylinder engine weighing 5560.0 N carried on elastic beams whose static deflection under the weight of the engine is 9.65mm. Calculate the frequency of free vibration in a vertical plane. The engine is now run at 130 r.p.m. the reciprocating parts weight 446.4 N, the stroke is 180mm and length of the connecting rod 356 mm. calculate from first principles the vertical movement of the engine due to a) Lack of primary balance b) Lack of secondary balance	10	1	5
	B. Why there is requirement of MPFI system over conventional fuel injection system? Explain Multipoint injection system with direct injection. Explain EGR Control valve.	10	3	7
Q2	A. A car weighing 22325.75 N has a static weight distribution on the axle of 60:40. The wheel base is 2.9 m and the height of centre of gravity above ground is 0.55 m. if the coefficient of friction on the highway is 0.6, calculate the advantages of having rear wheel drive rather than front wheel drive as far as gradiability is concerned, if engine power is not limitation.	10	1	1

	<p>B. Explain Control of wipers using</p> <ol style="list-style-type: none"> 1. Limit switch 2. Regenerative braking. 3. Flexible Rack System 	10	4	5
Q3	<p>A. Write aerodynamic forces and moments on a vehicle. Explain Drag force, lift force and side force with empirical equation. Calculate vehicle's drag force, with a frontal area of 1.5 m^2, C_D of 0.4, and Traveling at 30 m/s</p>	10	1	4
	<p>B. What is function of camshaft drive mechanisms? Write its different types and explain each one with suitable diagram.</p>	10	3	1
Q4	<p>A. Explain Air-bag and seat belt pre-tensioner systems in vehicle with suitable block diagram.</p>	10	3	6
	<p>B. A typical coil suspension spring has 12 effective coils of a mean diameter 124mm and made out of wires of diameter 15mm. the spring is design to carry a maximum static load of 3681.8 N. calculate the share stress and deflection under the above loading. If a maximum shear stress of 6376 5 bar is allowable in the material, then what is possible clearance in the spring? Take the value of $G=73575 \cdot 10^3 \text{ kPa}$. Explain Sway Bar used in automobile.</p>	10	3,2	3
Q5.	<p>A. Write short note on</p> <ol style="list-style-type: none"> 1. Power bulge 2. Nerf bar 3. Tubular space frame 4. Semi - Integral Frame 	10	1,4	4
	<p>B. What types of gear box used in automobile transmission? Describe operation of Synchromesh type gearbox with suitable diagram and compare it with other types of gear box.</p>	10	1	2
Q6	<p>A. A track has pivot pins 1.37m apart, the length of each track arm is 0.18 m and the track rod is behind front axle and 1 27 m long. Determine the wheel base which will give true rolling for all wheels when the car is turning so that angle of inside lock is 40° calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels.</p>	10	2	2

	B. Why ignition advance required in automobile. What are different types of mechanism used in ignition advance? Explain each mechanism in details.	10	3,4	3
Q7	(A) Explain in details the position and working of following 1) Lambda sensor 2) Knock sensor 3) flow sensor 4) Magnetic Sensors 5) Throttle potentiometer sensor	10	2	7
	(B) Distinguish between preventive maintenance and breakdown maintenance. Explain preventive maintenance: PM A, PM B, PM C & PM D.	10	3,2	6