

Time: 3 Hrs

Marks: 80

Note :

- Question No.1 is compulsory.
- Solve ANY THREE questions from the remaining five questions.
- Assume suitable data wherever required, but justify the same.

Q. 1 Solve ANY FOUR questions

- a) Explain the 'Customer as Participant' and 'Customer as Product' service operations. 5
- b) What are the factors influencing effective capacity? 5
- c) Differentiate between CPM and PERT. 5
- d) Define the following terms for assembly line: 5
 i) Workstation ii) Cycle Time iii) Task iv) Predecessor Task v) Balance Delay
- e) Explain the JIT concept and highlight the seven wastes considered in it. 5

- Q. 2 a) Illustrate the Production System with its characteristics. Explain the different types of Production Systems. 10
- b) A firm uses a simple exponential smoothing method with a smoothing constant of 0.15 for estimating the demand for a particular product. The actual demand for six months is available. The forecast for June is 500 units. Estimate the forecast for December. Calculate Mean Absolute Deviation (MAD) and BIAS if the actual demand for December is 510 units. 10

Months	Jun	Jul	Aug	Sep	Oct	Nov
Actual Demand	450	505	516	488	467	554

- Q. 3 a) Use a graphical method to minimize the time required to process the following jobs on the machines. For each machine specify the job which should be done first. Also, calculate the total elapsed time to complete both jobs. 10

		Machines				
Job 1	Sequence	A	B	C	D	E
	Time (Hrs)	6	8	4	12	4
Job 2	Sequence	B	C	A	D	E
	Time (Hrs)	10	8	6	4	12

- b) Explain the step-by-step evolution of ERP and give its features and limitations. 10

- Q. 4 a) A project scheduled has the following characteristics as shown in the table. Draw the network diagram, find the total float for each activity and find the critical path. 10

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time	4	1	1	1	6	5	4	8	1	2	5	7

- b) Draw a Travel Chart for a workshop that manufactures three products P, Q & R by using the same manufacturing facilities arranged in 6 departments A, B, C, D, E & F. The material handling is done by forklift truck. Pallets designed for material handling can carry 200, 300 & 150 pieces of the products P, Q & R respectively. The annual demand for each product is 12,000 numbers. The sequence of operation of the product demand that the products move is given in the table below. 10

Product	Movements
P	A-E-B-D-C-F
Q	A-B-C-D-E-F
R	C-B-A-E-D-F

- Q. 5 a) The following table gives the details of the workstations. Show the precedence diagram and determine the balance delay by Rank Positional Weight Method. 10

No.	1	2	3	4	5	6	7	8	9	10	11	12
Time (Mins)	0.2	0.4	0.7	0.1	0.3	0.11	0.32	0.6	0.27	0.38	0.5	0.12
Preceded by	--	--	1	1,2	2	3	3	3,4	6,7,8	5,8	9,10	11

Assume cycle time as 0.92 minutes.

- b) Explain the principles of Lean and Agile manufacturing. 10

- Q. 6 a) Illustrate forward scheduling and backward scheduling. 5

- b) Explain the strategies in aggregate planning. 5

- c) Explain the concept of a Relationship chart. 5

- d) Complete the material requirement plan for an item shown below. The order quantity is 50 units, lead time is 2 weeks with no safety stock required. 5

Week	1	2	3	4	5	6	7	8	9
Projected Requirement	10	12	15	18	20	22	25	28	30
Receipts									
On hand at the end of the period (30)									
Planned Order Release									

-----XXX-----XXX-----XXX-----

Time: (3 Hours)

Total Marks: 80

Note:

1. Question No. 1 is compulsory.
2. Attempt any **THREE** out of the remaining **FIVE** questions.
3. Assume suitable data if necessary.

- Q. 1.** Answer any **FOUR** of the following: (20)
- (a) Discuss on : pillars of Environmental Management.
 - (b) Elaborate the ISO 14001 EMS Model for Municipalities.
 - (c) Unawareness or ignorance of environmental protection will lead to detrimental consequence comment. Justify the statement.
 - (d) Define Environmental Objective as per ISO 14001
 - (e) Explain the various keys components of EMS.
- Q. 2.** (a) Write notes on the following : (10)
- a) Applications of Environmental Management System.
 - b) ISO 14001& ISO 14010
- (b) What are the challenges of Environmental Management? (10)
- Q. 3.** (a) How is CSR related to Environmental Management? Explain with an example. (10)
- (b) What are the guidelines to conduct and Environmental audit? (10)
- Q. 4.** (a) What is Total Quality Environment Management Concept? (10)
- (b) Discuss on factors destroying the Environment with example. (10)
- Q. 5.** (a) Write short note on Loss of Biodiversity as related to global environmental concerns. (10)
- (b) Discuss the key success factors for applied to almost all the operation for EMS implementation. (10)
- Q. 6.** Answer the following:- (20)
- (a) Discuss on 5 biggest environmental problems of year 2023.
 - (b) Explain limiting factors and carrying capacity as related to Ecosystems.
 - (c) How does EMS help in improving environment quality?
 - (d) Discuss on Environmental Issues related to Indian Context.

Time: 3 hour

Max. Marks: 80

Note-

1. Question one is compulsory.
2. Solve any three out of remaining five.

- Q.1 Explain any four of the following. 20**
- a Definition TQM and explain TQM concept
 - b Seven QC tools and short explanation
 - c Supplier selection
 - d Bench Marking
 - e Explain Win –Win policy with supplier.
- Q.2 a OC Curve for $n=80$, $c=2$, $AQL=1\%$, $LTPD=5\%$, $\alpha =0, 0466$, $\beta =0, 2306$, and Probability of Acceptance $= (1-\alpha) =0,9534$. Draw OC Curve 10**
- b Describe Business Process Re-Engineering in connection with TQM. 10**
- Q.3 a Explain PDCA Cycle with examples 10**
- b Explain various steps in implementing quality management system. 10**
- Q.4 a What is six sigma? Explain six sigma approach DMAIC. 10**
- b Describe the contribution of Juran and Crosby to quality management. 10**
- Q.5 a Explain the purpose of giving Malcom Baldrige quality award. 10**
- b Explain the following charts 10**
- (i) X-bar – R chart
 - (ii) P-chart
 - (iii) C-chart
- Q.6 a 1.Explain the Barriers of TQM' 5**
- 2.Write note on cost of quality 5**
- b What is Bench Marking concept? List out the process involves in the Bench Marking concept implementation 10**

Time: 3 hour

Max. Marks: 80

Note:

1. Question No.1 is compulsory.
2. Attempt any three questions from the remaining.
3. Assume suitable data if required.

- Q1. Solve any four out of five. 20**
- a** Define Adiabatic flame temperature &, Enthalpy of formation. **5**
 - b** Differentiate between boiler Mountings and accessories. **5**
 - c** Discuss methods to improve the thermal efficiency of the gas turbine cycle **5**
 - d** Classify Jet Propulsion engines. **5**
 - e** Differentiate between impulse and reaction water turbines. **5**
- Q2. a** A Pelton wheel is required to develop 6MW when working under a head of 300 m. It rotates at 550 rpm. Assuming Jet ratio of 10 and overall efficiency of 85%, Calculate: i) the diameter of the wheel ii) the quantity of water required, and iii) the Number of Jets. Take $CV = 1.0$ and speed ratio $= 0.45$. **10**
- b** The piston area of a single-acting reciprocating pump is 0.15 m^2 and the stroke is 30 cm. The water is lifted through a total head of 15 m. The area of the delivery pipe is 0.03 m^2 . If the pump is running at 50 rpm, find the coefficient of discharge, percentage slip, and power required to derive the pump. The actual discharge is 35 lit/sec. Take mechanical efficiency $= 0.85$ **10**
- Q3. a** A boiler plant supplies 5400 kg of steam per hour at 7.5 bar and 0.98 dry from feed water at 41°C . The boiler uses 670 kg of coal per hour having a calorific value of 31000 KJ/Kg i) Degree of superheat and temperature of steam generated ii) Calorific Value of Coal in KJ/ Kg. Determine: i) The thermal efficiency of the Boiler ii) Equivalent evaporation **10**
- b** What is the use of air vessels? Discuss the cavitation its effects and remedies for a pump. **10**
- Q4.a** Explain velocity compounding of impulse turbines. **6**
- b** Calculate the Enthalpy of combustion of gaseous Propane at 500K. The average value of specific heat of propane between 25°C and 500K is 2.1 KJ/Kmol-K **6**
- c** A gas turbine installation works on Brayton cycle between the temperature limits of 35°C and 715°C . For the maximum work developed calculate temperature at the end of compression, pressure ratio and thermal efficiency. **8**
- Q5.a** Discuss with sketch impact of jet on stationary curved plate and derive an expression for the same. **8**
- b** Explain construction and working of Rocket Engine. Also write its application. **8**
- c** Discuss different types of casing used in centrifugal pumps. **4**
- Q6. a** In a De-Laval turbine, steam issues from the nozzle with a velocity of 850 m/s. The nozzle angle is 20° . Mean blade velocity is 350 m/s and the blades are equiangular. The mass flow rate is 1000 kg/min. The friction factor is 0.8. Determine the blade angles, Power developed in KW, blade efficiency, stage efficiency if nozzle efficiency is 93%. **10**
- b** Derive an expression for maximum efficiency of Pelton wheel turbine. **10**

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- Note:**
1. Assume suitable data if necessary
 2. Figures to the right indicate full marks
 3. Question No. 1 is compulsory
 4. Solve any three out of the remaining five questions

Q1. Solve any four

- A Explain the phenomenon of composite materials with industrial applications. **5**
- B Explain the stiffness and compliance matrix for Anisotropic and Orthotropic materials. **5**
- C Explain the Plain stress assumption for composite lamina **5**
- D Explain the laminates codes of $[0/-45/60/-45/0]$ and $[0/90_2/0/90]$ **5**
- E Write short note on surface preparation for composites. **5**
- F Explain with neat diagram all the levels of a generic repair design. **5**

Q2.

- A Derive an expression of Hook's law for a Two-Dimensional Unidirectional lamina. **10**
- B Explain with neat diagram the working of hand lay-up method for composite materials with advantages and disadvantages. **5**
- C Write short note on significance of Failure Envelopes **5**

Q3.

- A Differentiate between Vacuum Infusion and Vacuum Bagging techniques for composite manufacturing on the basis of diagram, set-up, operation, advantages, disadvantages and applications. **10**
- B Illustrate with neat sketch the Coin-Tap inspection method **5**
- C Explain the selection criteria for repair methods for composites. **5**

Q4.

- A Derive an expression of failure criteria with failure envelope according to Maximum Strain theory. **10**
- B Illustrate with neat sketch the ultrasonic method of inspection for composites. **5**
- C Illustrate with neat sketch the matrix cracks repair method in composites. **5**

Q5.

- A Differentiate between the passive and active methods of thermography inspection based on principle, construction, working, pros and cons of methods. **10**
- B Write short note on Strength ratio. **5**
- C Illustrate with neat sketch the resin transfer moulding technique. **5**

Q 6.

- A Explain various types of defects may occur in composite parts **10**
- B Explain repair techniques for Delaminations in composites. **5**
- C Explain various types of laminates with their codes. **5**

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