

**6TH SEM./MECH/MECH(PROD.)/ MECH(MAIN.) / DME/MECH(IND.INT)/
MECH(SAND.) /AUTO/ 2022(S)
TH-1 Industrial Engineering & Management**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right-hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What are the three times estimate in PERT analysis?
 - b. Define plant layout.
 - c. State the significance of ISO certification.
 - d. What are the limitations of the graphical method in solving LPP?
 - e. Define CPM.
 - f. State the uses of inventory.
 - g. What is the need of inspection?
 - h. Define Quality & Control.
 - i. What do you mean by operation research?
 - j. State the three objectives of plant maintenance.

2. Answer **Any Six** Questions 6 x 5
 - a. State the advantages & disadvantages of master scheduling.
 - b. What are the factors which affect the quality of manufacturing?
 - c. Compare PERT with CPM.
 - d. Explain ABC analysis.
 - e. Describe different types of over heads.
 - f. Give symptoms of a bad plant layout.
 - g. What are the characteristics if ISO-9000?

3 Explain different factors influencing plant location. 10

4 Find the critical path and the duration of project completion for the data given in table. 10

Activity	Predecessor	Duration
A	-	7
B	-	13
C	A	10
D	A	17
E	B	3
F	D, E	26

5 What are the different types of control chart? Discuss about \bar{X} -Chart & P-Chart 10

6 Find the graphical solution of LPP for the following condition 10

$$\text{Min } Z = 60x + 40y$$

Subject to

$$30x + 10y \geq 240$$

$$10x + 10y \geq 160$$

$$20x + 60y \geq 480$$

$$x, y \geq 0$$

7 Write short notes on: 10

- a Scheduling
- b Breakdown Maintenance
- c Six Sigma
- d Job Order production

Th-2 AUTOMOBILE ENGINEERING & HYBRID VEHICLES

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What is Air Fuel ratio?
 - b. What is the need of a Differential?
 - c. Define Automobile.
 - d. What is the function of a Spark Plug?
 - e. What is an Electric Vehicle? Give two examples.
 - f. Which types of batteries are used in an Electric Vehicle?
 - g. Name various types of Fuel cells.
 - h. What is the need of braking system in automobile?
 - i. How ignition takes place in petrol engine?
 - j. What do you mean by Carburetion process?

2. Answer **Any Six** Questions 6 x 5
 - a. Write down the advantages of Hydraulic Brake.
 - b. State the layout of Automobile chassis with major components.
 - c. Differentiate between Sliding mesh and Synchromesh gear box.
 - d. Differentiate between Hybrid Vehicle and Electric Vehicle.
 - e. Explain the common ignition troubles and its remedies.
 - f. With a help of neat sketch, show the pump circulation system of water cooling.
 - g. What are components of Transmission system? Explain in brief.

3. Describe the lubrication system of I.C engine. 10
4. Describe the working principle of Fuel Feed Pump with neat sketch. 10
5. Describe the working of Single Plate Clutch with neat sketch. 10
6. Describe constructional features and working of a Telescopic Shock Absorber. 10
7. Describe the working principle of fuel injection system for multi cylinder (in-line) engine. 10

**6TH SEM./MECH./DME/MECH(PROD.)/MECH(MAINT)/
MECH(IND.INT)MECH(SAND)/2022(S)
TH-3 Power Station Engineering**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Classify power plant.
 - b. Define specific steam consumptions.
 - c. What is an Air Pre-heater? State its field of use.
 - d. What is Nuclear Reactor?
 - e. What is the function of surge tank in Hydro electric power plant?
 - f. Draw P-V & T-S diagram of Rankine cycle.
 - g. Define Draught.
 - h. Write name of fuels used in Gas Turbine power station?
 - i. What is the function of cooling tower?
 - j. What is the function of steam condenser?

2. Answer **Any Six** Questions 6 x 5
 - a. Write the difference between Jet condenser and Surface condenser.
 - b. State merits and demerits of Gas turbine station.
 - c. State the criteria for selection of site for a Hydel power plant.
 - d. Explain the working principle of ESP.
 - e. Explain fuel storage and supply system in a diesel power plant.
 - f. Differentiate between Captive and Central power plant.
 - g. Differentiate between boiler mountings and accessories.

3. Describe layout of steam power station. 10

4. Explain the working of PWR with neat sketch. 10

5. Explain the working of diesel power plant. 10

6. A simple Rankine cycle works between pressure 28 bar and 0.06 bar. The initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio & SSC. 10

7. Define compounding. Explain pressure & velocity compounding with neat sketch. 10

Th4 Advance Manufacturing Processes

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right-hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. How an Ultrasonic Machining tool removes the material?
 - b. Explain Encapsulation process.
 - c. What is meant by Manufacturing?
 - d. Define Additive Manufacturing process.
 - e. Name two process parameters that affect extrusion of plastics.
 - f. What is Concurrent Engineering?
 - g. What is meant by processability of plastics?
 - h. State the purpose of Maintenance.
 - i. State the layouts of Special Purpose Machining.
 - j. State the full form of LASER.

2. Answer **Any Six** Questions 6 x 5
 - a. Discuss about Calendering process with sketch.
 - b. Compare Additive Manufacturing with CNC.
 - c. Discuss about Abrasive Jet Machining Process with diagram.
 - d. Explain Repair cycle.
 - e. What is Total Productive Maintenance?
 - f. Explain Injection Moulding process with diagram.
 - g. Discuss about Special Purpose Machining.

3. Discuss about any two types of Thermoforming process with sketch. 10

4. Discuss about different types of Machine Tool maintenance. 10

5. Describe briefly about Blow Moulding Process with neat sketch. 10

6. Explain Electric Discharge Machining Process with neat sketch. 10

7. Discuss about the 3-D Printing process principle, materials, advantages and limitations with necessary diagram. 10

6TH SEM./AUTO/DIP.MECH./MECH(MAIN)/ MECH(PROD) /MECH(SAND)/
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TH-1 Industrial Engineering And Management

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. Define plant layout.
 - b. State the importance of plant maintenance.
 - c. Define LPP.
 - d. What is project scheduling? State the full form of CPM & PERT.
 - e. Define float and slack.
 - f. Define inventory control and its benefits.
 - g. Differentiate between variable charts and attribute chart.
 - h. Define JIT.
 - i. What is forecasting?
 - j. Define safety stock and lead time.
2. Answer **Any Six** Questions 6 x 5
- a. Explain factors influencing plant location.
 - b. Solve the LPP by graphical method.
Min $Z=20x_1+10x_2$
Subject to constraint $x_1+2x_2\leq 40$, $3x_1+x_2\geq 30$, $4x_1+3x_2\geq 60$ & $x_1, x_2\geq 0$
 - c. Write different type of production with their characteristics.
 - d. Explain lean manufacturing.
 - e. Alpha industry estimates that it will sell 12000 units of its product for forthcoming year. The ordering cost is 100/- per order and carrying cost per unit per year is 20% of the purchase price per unit. The purchase price per unit is 50/-. Find
 - i) EOQ
 - ii) no of order per year
 - iii) Time between successive orders.
 - f. State the advantages and disadvantages of quality control.≥

g Draw the network and find the critical path.

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	5	2	3	1	6	5	8	4	7	1	2	5

- 3 Explain different types of plant maintenance. 10
- 4 What are the factors influencing plant location. 10
- 5 Explain ABC analysis. 10
- 6 Write notes on 10
- 1- routing
- 2- scheduling
- 3- dispatching
- 4- controlling
- 7 A small project is composed of the following events whose time estimates are given below in weeks. 10

event	T_0	T_m	T_p
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

- a) Draw the network and find critical path (b) find t_e .(c) find standard deviation of project.
- d) What is the probability that the project will completed
- i) At least 4 weeks earlier than t_e .
- ii) Not more than 4 weeks later.
- iii) If $D=19$ than what is probability of not meeting the due date.
- iv) Find duration of project at 95% probability.
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**6TH SEM / MECH/DIP.IN MECH/MECH(MAINT)/ MECH(PROD)/
MECH(SAND)/MECH.(IND.INT)/ 2023(S)**

TH-2 Automobile Engineering & Hybrid Vehicles

Full Marks: 80

Time:3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Define automobile.
 - b. What are the advantages of Battery Ignition System?
 - c. Classify automobile.
 - d. What is the purpose of shock absorber?
 - e. Define air-fuel ratio.
 - f. Name the different Types of Brake System in Automobile.
 - g. What are the Types of Engine Cooling Systems?
 - h. Define hybrid vehicle.
 - i. What is a drive train?
 - j. Why Choke Valve is used?

2. Answer **Any Six** Questions 6 x 5
 - a. How a hydraulic braking system works in an automobile? Explain it.
 - b. State the advantages and disadvantages of aircooling system.
 - c. What is the purpose of spark plug in an automobile?
 - d. Discuss about the basic working principle of diesel fuel filter.
 - e. Draw the layout of automobile chassis (both front & top view).
 - f. Explain the working of four-speed gearbox.
 - g. Discuss about hybrid vehicles.

3. Describe the operational advantages, present performance and applications of Electric Vehicles 10

4. What is the necessity of gearbox in an automobile? Discuss about the different parts of gearbox. 10

5. Describe the lubrication System of I.C. engine. 10

6. Describe the Battery ignition system in an automobile. 10

7. Discuss briefly the working principle of fuel injection system for multi cylinder Engine with sketch. 10

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TH-3 Power Station Engineering

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1 & 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What is the function of a condenser?
 - b. What do you mean by fusion and fission reaction?
 - c. State any four sources of energy.
 - d. What are the functions of fuel injection system in a diesel power plant?
 - e. Name the essential elements of a Hydro-electric power plant.
 - f. State the function of an air pre-heater.
 - g. What is the function of moderator in a nuclear power plant?
 - h. Define draught.
 - i. Write name of fuels used in gas turbine power station.
 - j. What is an 'economiser'?
2. Answer **Any Six** Questions 6 x 5
 - a. State the advantages and disadvantages of diesel power plant.
 - b. Write a short note on boiler accessories.
 - c. Explain the working of BWR with neat sketch.
 - d. State the criteria for selection of site for a gas turbine power plant.
 - e. Differentiate between central power station and captive power station.
 - f. State the advantages and disadvantages of hydroelectric plants.
 - g. Explain about different types of cooling tower.
3. Explain in detail about cooling system & lubricating system of a diesel power plant. 10
4. Explain Rankine cycle with P-V and T-S diagram and determine its efficiency. 10
5. Explain different methods of disposal of nuclear waste. 10
6. Briefly describe about the main components of a gas turbine power plant. 10
7. What are the criteria for site selection of a hydro electric power plant? Explain in detail. 10

**6TH SEM ./MECH./DIP IN MECH. /MECH(SAND.)/ MECH(IND.INT)
/2023(S)**

TH-4 Advance Manufacturing Processes

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right-hand margin indicates marks

1. Answer All questions 2 x 10
 - a. Define Total productive Maintenance.
 - b. Write about the application of Plastics.
 - c. Compare Additive Manufacturing and CNC.
 - d. Define Web based Rapid prototyping system.
 - e. What are the different types of Moulding process?
 - f. Differentiate between Modern Machining Processes and Traditional Machining processes.
 - g. Write the applications of Ultrasonic machining.
 - h. Explain encapsulation process.
 - i. Write the application of Electron Beam Machining.
 - j. Explain Flexible Manufacturing process.

2. Answer Any Six Questions 6 x 5
 - a. Write about the different application of Additive Manufacturing process.
 - b. State the layouts of Special Purpose Machining.
 - c. Write about the concept and general elements of Special Purpose Machines.
 - d. Write about Transfer moulding in detail.
 - e. Explain Plasma Arc Machining.
 - f. Explain Extruding and Casting in Plastic processing
 - g. Write about the rapid prototyping processes.

3. Explain Electro Chemical Machining process in detail. 10

4. Discuss 3-D printing process principle, materials, advantages and limitations. Draw the Diagram where necessary. 10

5. Write about the principle, Material removal rate and application of Laser Beam machining. 10

6. Discuss about different types of machine tool maintenance. 10

7. Write short notes on 4 x 2.5
 - a. Repair cycle
 - b. Productivity improvement by SPM
 - c. Concurrent Engineering
 - d. Laminating Plastics