M-503 GREEN ENERGY AND THERMAL SYSTEMS

BLUE PRINT OF MODEL QUESTION PAPER

Sl. No	Chapter Name	Periods Allocated	Weightage Allocated	Question Wise Distribution of Weightage			Marks Wise Distribution of Weightage		
				R	U	Ap	R	U	Ap
1	Thermodynamic Processes of Vapour.	15	16	1	1	1	3	3	10
2	Steam Boilers	10	16	1	1	1	3	3	10
3.	Steam Turbines	15	26	1	1	2	3	3	20
4	Thermal and Nuclear Power Plants	15	26	1	1	2	3	3	20
5	Green Energy and E-Vehicles.	20	26	1	1	2	3	3	20
TOTAL		**75**	**110**	**5**	**5**	**08**	**15**	**15**	**80**

Note: R-Remembering; U-Understanding; Ap -Applying;

Unit Test - 1

Q.No	Question from the Chapter	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Properties of Steam, Steam Boilers, Steam Turbines	R,U	4	CO1,CO2,CO3
2	Properties of Steam	U	3	CO1
3	Properties of Steam	U	3	CO1
4	Steam Boilers	U	3	CO2
5	Steam Turbines	U	3	CO3
Part - B (24 marks)				
6	Properties of Steam	Ap	8	CO1
7	Steam Boilers	Ap	8	CO2
8	Steam Turbines	Ap	8	CO3

Unit Test - 2

Q.No	Question from the topic	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	**Thermal and Nuclear Power Plants, Green Energy and E-Vehicle Technology.**	R,U	4	CO4, CO5
2	Thermal and Nuclear Power Plants	U	3	CO4
3	Thermal and Nuclear Power Plants	U	3	CO4
4	Green Energy and E-Vehicle Technology.	U	3	CO5
5	Green Energy and E-Vehicle Technology.	U	3	CO5
Part - B (24 marks)				
6	Thermal and Nuclear Power Plants	Ap	8	CO4
7	Green Energy	Ap	8	CO5
8	E-Vehicle Technology	Ap	8	CO5

R-Remembering; U-Understanding; Ap-Applying; An- Analylising

MODEL PAPER

Unit Test - I

GREEN ENERGY AND THERMAL SYSTEMS (M-503)

Time : 90 Minutes Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4Questions carry 3 marks each*

1. (a) Dryness fraction of saturated liquid is _____.
   (b) What is the function of blow off cock?
   (c) Write the expression for critical pressure ratio for maximum discharge in the nozzle.
   (d) In jet condenser, water and steam directly mixes. (true/False)
2. Write the expressions for enthalpy of super heated steam, specific volume of superheated steam and entropy of super heated steam.
3. Determine the mass and enthalpy of 0.5 m^3 of wet steam with a degree of wetness equal to 10% and a pressure of 10 bar.
4. Mention various factors influencing the boiler efficiency.
5. Differentiate between impulse turbine and reaction turbine.

PART – B

Instructions: *Part B consists of **3** Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. One kg of steam at pressure 10bar and dryness fraction 0.4 is heated at constant pressure to a temperature of 2000C. Find (a)Workdone,(b)Heat Transfer and Change in entropy.

   (OR)

   2 kg of steam initially at a pressure of 12 bar and a temperature of 250^0C expands polytropically to 1.2 bar. Find (a) the final condition (b) work done (c) heat transfer (d) change in entropy
7. Explain Lamont boiler with a neat sketch.

   (OR)

   Explain the Benson boiler with a neat sketch.
8. Steam at 20bar and temperature 250^0C is expanded isentropically to a pressure of 0.1bar. The mass flow rate of the steam is 1kg/s. Determine throat and exit diameters of the nozzle.

   (OR)

   Explain the working of Low level jet condenser with the help of neat sketch.

MODEL PAPER

Unit Test - I

GREEN ENERGY AND THERMAL SYSTEMS (M-503)

Time : 90 Minutes Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one mark questions, and remaining 4Questions carry 3 marks each*

1. (a) Function of moderator in nuclear power plant is……
   (b) Wind energy is an example of Green energy. (True/False)
   (c) Fuel cell converts chemical energy in _____energy.
   (d) The fuels used in nuclear power plant are _____
2. List any three elements of thermal power plant.
3. Write the advantages and disadvantages of nuclear power plant.
4. What is the principle of photovoltaic cell.
5. Explain briefly plug in hybrid electric vehicle..

PART – B

Instructions: *Part B consists of **3** Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. Draw the schematic layout of steam power plant and mention the function of each component.

   (OR)

   Explain the working of Nuclear reactor with the help of neat sketch.
7. Illustrate the Hybrid electric vehicles.

   (OR)

   Draw the block diagram of Battery electric vehicle(BEV) and mention function of each part in BEV.

8. EExplain the working of Solar still with a neat sketch.

   (OR)

   Explain the working of horizontal axis wind mill with the help of neat sketch.

MODEL PAPER

D.M.E. –V SEMESTER END EXAMINATION

GREEN ENERGY AND THERMAL SYSTEMS (M-503)

Time : 3 Hours Total Marks : 80

PART-A **10 x 3 = 30**

INSTRUCTIONS: (1) Answer all questions and each question carries three marks.

1. Define dryness fraction and degree of super heat of vapour.
2. What is the change in specific entropy of wet steam at 8 bar and 0.9 dry to the steam at 12 bar and 350^0C?
3. State the need of high pressure modern boilers.
4. Write the function of (i) Economiser (ii) Steam trap and (iii) Steam injector.
5. State the principle of photovoltaic cell.
6. Steam enters a steam nozzle at a pressure of 1.8 Mpa and at a temperature of 350^0C and expands to a pressure of 0.12 Mpa with 95% dry. Calculate the exit velocity of the steam.
7. Classify turbines based on any three criteria.
8. Write any three differences between Battery electric vehicle and conventional vehicle.
9. List the effects of pollutants of the thermal power plant.
10. Mention the advantages and disadvantages of nuclear power plant.

PART-B **5 x 10=50**

INSTRUCTIONS: (1) Answer any **five** questions and each question carries ten marks.

11. 1 kg of steam at 20 bar and 250^0C undergoes a non-flow process to a pressure of 8 bar. If the final volume of the steam is 0.242 m^3, find (a) The equation of the processes (b) The work energy transferred.
12. Explain the working of Lamont boiler with a neat sketch.
13. (a)Explain the working of Surface condenser with the help of neat sketch.
    (b) Explain the working of parson's reaction turbine.
14. Dry and saturated steam enters the nozzle with 135 m/s and expands from 10 bar to 0.1 bar. Using the steam tables find (a) Dryness fraction at the exit (b) Velocity of steam at exit.
15. Draw the schematic layout of steam power plant and explain the function of each component.
16. Explain the working of pump circulation solar water heater with the help of neat sketch.
17. Explain the working of Pressurised Water Reactor (PWR) with a neat sketch.
18. Explain in details about
    (a) Hybrid electric vehicle
    (b) Fuel cell electric vehicle