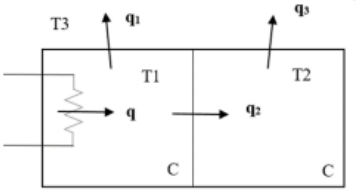
S8 - MECHANICAL QUESTION BANK 2024

Questions compiled by

DEPARTMENT OF MECHANICAL ENGINEERING

VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR, THIRUVANATHAPURAM

CODE: MET402	COURSE NAME: MECHATRONICS		Credit: 3
Q.No	**Module I**	**Month & Year**	**Marks**
1	Differentiate incremental and absolute encoders	June 2023	3
2	Define Mechatronics and describe the different realms where it finds applications	June 2023	3
7	Distinguish between static and dynamic characteristics of a sensor.	October 2023	3
8	Mention any three differences between Hydraulic and Pneumatic actuators.	October 2023	3
3	How Mechatronic Design Process becomes different from conventional design process? Explain with a block diagram.	June 2023	10
4	What are the key elements of a mechatronic system? Explain.	June 2023	4
5	What is the working principle of RTD? List out its advantages.	June 2023	7
6	Describe the working of an Ultrasonic flow sensing device.	June 2023	7
9	Illustrate the working of LVDT. Explain the voltage variation and phase change during the use of LVDT as a displacement sensor	October 2023	10
10	Explain the working of any one non-contact temperature measurement system.	October 2023	4
11	Explain the working of resolver and synchro with the help of a neat sketch.	October 2023	10
12	Describe the working principle and applications of acoustic emission sensor system	October 2023	4
Q.No	**Module II**	**Month & Year**	**Marks**
1	What is meant by MEMS?	June 2023	3
2	Name any three rotary actuators used in Mechatronics	June 2023	3
3	Distinguish between pilot operated and direct operated DCVs.	October 2023	3
4	Differentiate between isotropic etching and anisotropic etching.	October 2023	3
5	Describe Deep reactive Ion Etching process.	June 2023	7
6	What is meant by LIGA process? Explain the different steps involved in it.	June 2023	7
7	Describe the basic components of a hydraulic system with an example	June 2023	10
8	Describe the working of any one of the flow control valve with line diagram	June 2023	4
9	Develop a hydraulic circuit for any industrial purpose in which pressure sequence valve is used to initiate an operation only when another operation has been completed. Explain the working and purpose of the circuit.	October 2023	9
10	Illustrate the working of any one type of MEMS based pressure sensor.	October 2023	5
11	Explain the LIGA process in MEMS fabrication with neat sketches.	October 2023	10
12	Discuss the working of a process control valve.	October 2023	4
Q.No	**Module III**	**Month & Year**	**Marks**
1	What are the major components of a CNC machine in a mechatronic perspective?	June 2023	3
2	what are the advantages of a re-circulating ball screws?	June 2023	3
3	List the basic building blocks of an electrical system and write their describing equations.	October 2023	3
4	Enumerate the factors that must be considered while designing guideways	October 2023	3
5	What is meant by guide ways? Explain most commonly used guide ways in CNC Machines.	June 2023	7
6	How the antifriction bearing is different from other bearings? What are the advantages of such bearings?	June 2023	7
7	Name any two measuring systems used for CNC Machines and their use in such machines.	June 2023	8
8	Draw the mechanical translation diagram to illustrate a car suspension system as a two mass system.	June 2023	6
9	Explain the mechanism of recirculating ball screw with neat sketch. How backlash can be avoided. Enumerate the advantages of recirculating ball screw?	October 2023	10
10	Develop a mathematical model for machine mounted on the ground.	October 2023	4
11	Figure shows a thermal system involving two compartments, with one containing a heater. If the temperature of the compartment containing the heater is T1, the temperature of the other compartment T2 and the temperature surrounding the compartments T3, develop equations describing how temperatures T1 and T2 will vary with time. All the walls of the containers have same resistance, 'R' and negligible capacitance. The two containers have same capacitance 'C'.	October 2023	10
			
12	Discuss the salient features of hydrostatic and hydrodynamic bearings.	October 2023	4
Q.No	**Module IV**	**Month & Year**	**Marks**

1	Draw a line diagram which represents typical elements of a closed loop control.	June 2023	3
2	Briefly describe the use of timer in a mechatronic system	June 2023	3
3	Explain the concept of 'latching' in PLC programming	October 2023	3
4	Sketch a simple pick and place robot. Label the parts	October 2023	3
5	Represent the engine management system as a mechatronic system and explain its working	June 2023	14
6	What are the basic elements of a PLC? Explain with a block diagram	June 2023	14
7	Discuss the functions of adaptive control systems used in machine tools. Explain any two commonly used forms of adaptive control systems used in CNC machine tools.	October 2023	14
8	Discuss the working of mechatronics system-based automobile engine management system with the help of sketches and block diagrams.	October 2023	10
9	Compare the working of an open loop and closed loop control system, using block diagram. Mention the different elements involved in each system.	October 2023	4
Q.No	**Module V**	**Month & Year**	**Marks**
1	What is meant by image processing?	June 2023	3
2	Mention three distinct advantages of Machine vision system	June 2023	3
3	Define the terms (i) image acquisition (ii) image processing.	October 2023	3
4	Explain thresholding of a grey scale image.	October 2023	3
5	Explain the working of a CCD camera used in machine vision systems	June 2023	14
6	What is meant by contrast stretching and thresholding in machine vision system? Explain	June 2023	14
7	Describe the working of a permanent magnet DC motor and brushless permanent magnet DC motor with diagrams. Identify their differences.	October 2023	10
8	Discuss the features of CCD and CID cameras	October 2023	4
9	Illustrate the working of permanent magnet stepper motor and hybrid stepper motor.	October 2023	10
10	Explain the working principle of any one light-based range finder	October 2023	4

CODE: MET 476	COURSE NAME: CRYOGENIC ENGINEERING		Credit: 3
Q.No	**Module I**	**Month & Year**	**Marks**
1	Explain Mechanical properties of Metals and Plastics at low temperature	October 2023	14
2	Discuss the applications of Cryogenics Engineering.	October 2023	14
3	Explain super conductivity and list any two applications of super conductivity.	June 2023	8
4	Why Stainless steel is one of the best material for the cryogenic applications?	June 2023	6
5	Explain the variation of any two mechanical, any two thermal and any one electrical properties of materials at cryogenic temperatures.	June 2023	14
6	Show how the ultimate strength of the material varies at cryogenic temperature.	October 2023	3
7	List the applications of Cryogenic Engineering.	June 2023	3
8	Show the variation of thermal conductivity of stainless steel with temperature.	October 2023	3
9	Why thermal expansion/contraction is important in Cryogenic Engineering?	June 2023	3
Q.No	**Module II**	**Month & Year**	**Marks**
1	With neat sketches explain the critical components used in cryogenic liquefaction system.	October 2023	14
2	Explain Simple Linde – Hampson system with sketches and T-s diagram	October 2023	14
3	Explain pre-cooled Linde-Hampson system for the liquefaction of gases with a neat sketch and T-s diagram?	June 2023	14
4	Explain ortho-para conversion of hydrogen with suitable sketches.	June 2023	5
5	Explain Claude system for the liquefaction with T-s diagram?	June 2023	9
6	Difference between Refrigerator and Liquefier.	June 2023	3
7	Explain the significance of inversion temperature for gases.	June 2023	3
8	Draw the T-s diagram of an ideal liquefaction system.	October 2023	3
9	Explain Joule-Thompson effect.	October 2023	3
Q.No	**Module III**	**Month & Year**	**Marks**
1	Illustrate the working of Gifford McMahon refrigerator.	October 2023	7
2	Illustrate the working of Linde-Hampson refrigerator with a neat sketch.	October 2023	7
3	Explain the adiabatic demagnetization process with a neat sketch?	October 2023	6
4	Why regenerators are used in cryogenic refrigeration systems? Substantiate your answer with suitable reasons	October 2023	8
5	Illustrate the working of Philips refrigerator with a neat sketch.	June 2023	7
6	Illustrate the working of Gifford-McMahon refrigerator with a neat sketch.	June 2023	7
7	Explain magnetic refrigerator?	June 2023	6
8	Why regenerators are used in cryogenic refrigeration systems? Substantiate your answer with suitable reasons.	June 2023	8
9	List the basic requirements of a Cryocooler.	October 2023	3

10	Draw the schematic diagram of a regenerative heat exchanger.	October 2023	3
11	Explain ideal isothermal system for cryogenic refrigeration.	June 2023	3
12	Depending on the end use application, write 3 basic requirements have to be satisfied by a Cryocooler.	June 2023	3
Q.No	**Module IV**	**Month & Year**	**Marks**
1	Explain rotary vane pump used in Cryogenics with neat sketch	October 2023	8
2	With neat sketches explain any one gas separation system.	October 2023	6
3	List out various types of insulation used in cryogenics. Explain each of them and also mention their pros and cons.	October 2023	14
4	Explain ideal gas separation system.	June 2023	7
5	Explain Gibbs phase rule with T-s diagram	June 2023	7
6	Classify and explain various types of insulation used in cryogenics.	June 2023	14
7	Describe multi-layer insulation.	October 2023	3
8	Differentiate between Adsorption and Absorption.	October 2023	3
9	Classify vacuum pumps.	June 2023	3
10	What are the common techniques used for gas separation?	June 2023	3
Q.No	**Module V**	**Month & Year**	**Marks**
1	Explain any two temperature measurement devices used in cryogenics with suitable sketches?	October 2023	14
2	Explain the working of Mc Leod gauge and Pirani gauge	October 2023	14
3	Explain any two pressure measurement system used in cryogenics with suitable sketches?	June 2023	14
4	Explain any two temperature measurement system used in cryogenics with suitable sketches?	June 2023	14
5	Describe the working of hydro-static liquid level gauge.	June 2023	3
6	Briefly explain the working of a Mc Leod gauge.	June 2023	3
7	What are the most common hazards, that are encountered in a cryogenic environment?	October 2023	3
8	List liquid level measurement system used in Cryogenics.	October 2023	3

CODE: MET 424	COURSE NAME: INDUSTRIAL HYDRAULICS		Credit: 3
Q.No	**Module I**	**Month & Year**	**Marks**
1	Define Pascal's Law and its application	May 2023	3
2	Explain any 3 properties of Fluids	Oct 2023	4
3	Explain how the variation in temperature and pressure affect the Hydraulic fluids	May 2023	7
4	Compare Hydraulic system with Pneumatic system and list the advantages of Hydraulic system over the pneumatic system.	Oct 2023	10
5	List the properties of an ideal Hydraulic fluid	May 2023	4
6	List any 4 additives used in a hydraulic system	May 2023	3
7	Differentiate between viscosity and viscosity index	Oct 2023	3
Q.No	**Module II**	**Month & Year**	**Marks**
1	Discuss the importance of Pressure release valve	Oct 2023	4
2	Explain the construction and working of a gear pump, vane pump and piston pump	Oct 2023	7
3	Derive the expression for performance of a gear pump, vane pump. Piston pump	May 2023	7
4	Discuss the influence of pressure, size and speed on pump noise level	May 2023	4
5	Why can't a gear pump be used as a variable displacement pump	May 2023	3
Q.No	**Module III**	**Month & Year**	**Marks**
1	Explain the construction and working of piston type accumulators	Oct 2023	7
2	Describe a rectangular flat topped reservoir fitted with basic accessories	May 2023	7
3	Why is the actual flow required by a hydraulic motor greater than the theoretical flow	May 2023	3
4	Explain the construction and working of a balanced vane motor	May 2023	7
5	Describe end cushion provided in hydraulic cylinders	May 2023	3
6	Explain the need for pressurising a reservoir	Oct 2023	3
Q.No	**Module IV**	**Month & Year**	**Marks**
1	Explain pressure relief valve with a neat sketch	May 2023	7
2	Explain spool type directional control valve used to control double acting cylinder with a neat sketch	May 2023	7
3	Explain servo valve used in hydraulic power steering systems in automobiles with neat sketches	Oct 2023	7

4	Describe and draw the symbols of any five actuation methods used for moving the spool direction of control valves	Oct 2023	10
5	Differentiate between burst pressure and working pressure of conducting lines	May 2023	3
6	Differentiate the operating of a sequencing valve and pressure reducing valve	Oct 2023	4
Q.No	**Module V**	**Month & Year**	**Marks**
1	What is meant by meter in and meter out circuits	May 2023	3
2	Explain the working of a meter in circuit for controlling the motion of a rotary actuator with a neat diagram	May 2023	7
3	Explain the working of a meter out circuit for controlling the speed of a cylinder with a neat diagram	Oct 2023	7
4	With the help of an appropriate circuit diagram explain rapid traverse and speed control	May 2023	10
5	The table of a surface grinding machine needs automatic reciprocating motion. Draw a hydraulic circuit to achieve this	Oct 2023	10

CODE: MET478	COURSE NAME: POWER PLANT ENGINEERING		Credit:3
Q.No	**Module I**	**Month & Year**	**Marks**
1	Comment on the methods used for handling of coal. Write advantages of mechanical coal handling systems.	KTU Model	3 marks
2	State the advantages and disadvantages of pulverized coal firing.	KTU Model	3 marks
3	Illustrate and explain the functions of cooling tower.	KTU Model	3 marks
4	Define drift? How drift is eliminated in cooling towers?	KTU Model	3 Marks
5	Comment on the types of burner employed for pulverized coals in the thermal power plants	KTU Model	7marks
6	Explain the analysis of pollution from thermal power plants.	KTU Model	7marks
7	How ash is handled in the power plant? Explain the ash handling system. Mention any four equipment used for ash collection.	KTU Model	7 marks
8	Explain the principle involved in preparation of coal and what are the methods of preparation?	KTU Model	7 marks
9	Explain the purpose of boiler draught. How is it classified?	Jun-23	3 marks
10	Outline the characteristics of a supercritical boiler. Give an example.	Jun-23	3 marks
11	With a neat sketch explain the layout of a modern steam power plant.	Jun-23	10 marks
12	Explain steam rate and heat rate	Jun-23	4 marks
13	Explain the steps to be followed for coal handling in a thermal power plant.	Jun-23	8 marks
14	Illustrate and explain the working different types of cooling towers.	Jun-23	7 marks
15	Explain with neat diagrams about the improvisations provided to Rankine cycle for increasing efficiency.	CUSAT	7marks
16	Explain with the help of necessary diagrams about Fluidized Bed Combustion Boilers (FBC Boilers).	CUSAT	7marks
17	Distinguish between forced draught and induced draught cooling towers.	JNTUK	8 Marks
18	What are the methods available for feed water treatment, explain them briefly?	JNTUK	8 Marks
19	What are the different types of steam condensers? Give a brief description on evaporative type of condensers	JNTUK	7 Marks
20	Explain in detail about mechanical dust collector and Electrostatic Precipitator. Why both are used over a single unit in modern power plants.	JNTUK	13 Marks
21	Explain the construction and working principle of super critical Boilers with suitable sketch	JNTUK	7 Marks
Q.No	**Module II**	**Month & Year**	**Marks**
1	State the applications of diesel electric power plants.	KTU Model	3 marks
2	List the components present in the diesel electric power plants.	KTU Model	7 marks
3	Illustrate and explain working of a regenerative gas turbine and re-heater with a help of a P-V diagram.	KTU Model	7 marks
4	What are the methods of cooling in a diesel engine power plant?	KTU Model	3marks
5	List out the difference between open cycle and closed cycle gas turbine plant.	KTU Model	3 marks
6	Give the layout of diesel engine power plant. What are the advantages and disadvantages of diesel power plants?	KTU Model	7 marks
7			
8	Explain the different operations of Brayton Cycle.	Jun-23	3 marks
9	Explain combined cycle power plant. Illustrate any three design combination of gas turbine and steam power plant.	Jun-23	9 marks
10	List the advantages and disadvantages of gas turbine power plant over diesel power plant.	Jun-23	5 marks
11	Explain the importance of lubrication system in diesel power plant Write short notes on	Jun-23	10 marks
12	i. Dry sump lubrication system		
13	ii. Wet sump lubrication system		
14	List any four applications of a gas turbine power plant.	Jun-23	4 marks
15			
16	What are the methods used for improving the efficiency of a gas turbine plant?	CUSAT	14 marks

17	What are the discrete advantages of combined operation power plants?	JNTU	8 Marks
18	What factors should be considered while selecting a site for diesel power plant?	CUSAT	5 Marks
19	Write a note on fuel system of diesel power plant	CUSAT	7 Marks
Q.No	**Module III**	**Month & Year**	**Marks**
1	Mention the advantages of nuclear power plant.	KTU Model	3 Marks
2	Define “half-life” of nuclear fuels.	KTU Model	3 Marks
3	Describe the functionality of moderator	KTU Model	3 marks
4	Explain with neat sketches and with examples difference between controlled and uncontrolled chain reaction?	KTU Model	7 marks
5	Describe the boiling water reactor with the help of neat sketch and explain its chief	KTU Model	7 marks
6	Explain the working of a typical fast breeder nuclear reactor power plant, with the help of neat diagram.	KTU Model	7 marks
7	Define commonly used methods of nuclear waste disposal and discuss their salient	KTU Model	7 Marks
8	Explain the factors to be considered while selecting the site of a hydro power plant?	KTU Model	7 Marks
9	Explain the construction and working of Geo thermal power plant	KTU Model	7 Marks
10	What are the desirable properties of coolants used in nuclear reactor?	KTU Model	3 marks
11	List and explain any two nuclear fuels used in a nuclear reactor.	Jun-23	3 marks
12	List four advantages of nuclear power plants.	Jun-23	3 marks
13	Explain the working principle of CANDU reactor with the help of a neat sketch and write down its important characteristics.	Jun-23	10 marks
14	Outline the significance of coolant in nuclear reactor. List the desirable properties of	Jun-23	4 marks
15	With the aid of a sketch show all the important parts of a nuclear reactor, describing briefly the functions of each part.	Jun-23	10 marks
16	Explain breeder reactor. State its advantages.	Jun-23	4 marks
17	Enumerate any six desirable characteristics of a nuclear coolant	CUSAT	
18	Give a detailed explanation of liquid metal cooled nuclear reactors.	CUSAT	7 Marks
19	Explain BWR and PWR in a nuclear power plant.	CUSAT	5 Marks
20	Explain the pollution control technologies including waste disposal option for	CUSAT	5 Marks
21	Mention any four ways of Nuclear power plant safety	CUSAT	4 Marks
22	Outline the construction and working principle of Heavy water Cooled Reactor (HWR) with a neat sketch and discuss the advantages and disadvantages of HWR.	CUSAT	7 Marks
Q.No	**Module IV**	**Month & Year**	**Marks**
1	Comment on the working of a solar cell.	KTU Model	3Marks
2	What are the advantages and limitations of tidal power plant?	KTU Model	3Marks
3	Explain in detail about the various types of Wind energy system	KTU Model	7marks
4	Explain with a neat diagram of wind electric generating power plant.	KTU Model	7 marks
5	List out various applications of geothermal energy.	Jun-23	3 marks
6	Draw and explain two basic design of ocean thermal energy conversion (OTEC)	Jun-23	10 marks
7	i. Open cycle (or) Claude cycle.		
8	ii. Closed cycle (or) Anderson cycle.		
9	Explain the working principle of ‘photovoltaic solar energy conversion’.	Jun-23	4 marks
10	With a neat layout diagram explain the components and working of hydro power	Jun-23	10 marks
11	List out various guidelines for fixing optimum size of a biogas plant.	Jun-23	4 marks
12	Explain briefly how turbines are classified in hydroelectric plant.	CUSAT	8 marks
13	Give a brief explanation of solar pond technology.	CUSAT	7 Marks
14	Give a brief account of any two types of wind turbines	CUSAT	7 Marks
15	Explain about the types of solar energy collectors.	CUSAT	7 Marks
16	Explain about the types of dams with necessary diagrams.	CUSAT	7 Marks
17	Explain the necessity of spillway in dams. Also classify based on flow.	CUSAT	7 Marks
18	Explain the principle of working and construction of solar power plant using suitable sketches. State their advantages, disadvantages and applications	CUSAT	14 Marks
19	Describe with neat sketch the working of solar photo voltaic cell	CUSAT	7 Marks
Q.No	**Module V**	**Month & Year**	**Marks**
1	Define the importance of capital cost in a power plant.	KTU Model	3 Marks
2	Define load factor and list out methods for improvement in load factor	KTU Model	3 Marks
3	What are the elements which contribute to the cost of the electricity? How can the	KTU Model	7 marks
4	Define power plant economics? Explain the fixed and operating cost of a power	KTU Model	7 marks
5	Discuss briefly the methods to reduce power generation costs	KTU Model	8 Marks
6	Define demand factor and load factor. Mention its significance.	Jun-23	3 Marks
7	Illustrate a load curve with the help of a neat sketch	Jun-23	3 Marks
8	Summarize various capital and operational cost to be considered in the cost analysis	Jun-23	9 marks

<table>
<tr><td>9</td><td>Explain the various factors to be considered while selecting the location of a power</td><td>Jun-23</td><td>5 marks</td></tr>
<tr><td>10</td><td>A generation station of 96 MW capacity has a daily load curve with the following demands:1.Plot the daily load curve and the load duration curve.
2. Find the load factor, the reserve capacity and plant capacity factor.
<table><tr><td>Time</td><td>12 am- 6 am</td><td>6am- 5 pm</td><td>5 pm – 7 pm</td><td>7pm- 9 pm</td><td>9pm-10 pm</td><td>10pm-12am</td></tr><tr><td>Load (MW)</td><td>48</td><td>30</td><td>72</td><td>86</td><td>84</td><td>60</td></tr></table></td><td>Jun-23</td><td>7 Marks</td></tr>
<tr><td>11</td><td>Define tariff. Explain any one type of tariff.</td><td>Jun-23</td><td></td></tr>
<tr><td>12</td><td>Define Demand Factor and Load Factor of a power plant.</td><td>CUSAT</td><td></td></tr>
<tr><td>13</td><td>Briefly explain various costs elements to form total cost of a System.</td><td>CUSAT</td><td></td></tr>
<tr><td>14</td><td rowspan="2">A generating station supplies the following loads: I5 MW, 12 MW, 8,5 MW, 5 MW and 0.45 MW. The station has a maximum demand of 22 Mw. The annual load factor is 0.48. Calculate (i) The diversity factor and (ii) The demand factor.</td><td rowspan="2">CUSAT</td><td rowspan="2">5 Marks</td></tr>
<tr><td>15</td></tr>
<tr><td>16</td><td>Define the terms i)Load curve ii)Load duration curve iii) Maximum demand iv) Diversity factor v)Load factor</td><td rowspan="3">CUSAT</td><td>7 Marks</td></tr>
<tr><td>17</td><td>What are the different methods used to calculate depreciation cost of power plant?</td><td>2 Marks</td></tr>
<tr><td>18</td><td>list the various initial cost of a power station</td><td>2 Marks</td></tr>
<tr><td>19</td><td>A new factory having a minimum demand of 100 kw and a load factor of 25% is comparing two power supply agencies.
i) Public supply tariff is Rs. 40 per kw of maximum demand plus 2 paise per kwh.
Capital cost = Rs. 70,000
Interest and depreciation = 10%
ii) Private oil engine generating station.
Capital cost = Rs. 2,50,000
Fuel consumption = 0.3 kg per kwh
Cost of fuel = Rs. 70 per tonne
wages = 0.4 paise per kwh
Maintenance cost = 0.3 paise per kwh
Interest and depreciation = 15%</td><td>CUSAT</td><td>14 Marks</td></tr>
</table>

CODE: MET458	COURSE NAME: ADVANCED ENERGY ENGINEERING		Credit: 3
Q.No	**Module I**	**Month & Year**	**Marks**
1	Explain the importance of renewable energy resources in India's power requirement context.	KTU August 2021	6
2	List any four advantages and disadvantages of hydro electric power plant.	KTU August 2021	4
3	Explain the components, layout and working principle of a nuclear power plant.	KTU August 2021	10
4	Elaborate on the future demand of fossil fuels as conventional energy source.	KTU December 2021	5
5	With the help of a schematic explain the components of a nuclear power plant.	KTU December 2021	5
6	List the advantages and disadvantages of a hydro power plant over thermal power plant.	KTU December 2021	4
7	Explain about the construction and working of a hydro power plant with the help of a neat layout.	KTU December 2021	6
8	List major five renewable sources of energy. What is the significance of renewable sources on current global energy demand?	KTU June 2022	6
9	What is regeneration in steam power plant?	KTU June 2022	4
10	Sketch the layout of a steam power plant. Explain the various circuits in a stem power plant	KTU June 2022	6
11	What is a surge tank and why it is used in hydal power plants?	KTU June 2022	4
Q.No	**Module II**	**Month & Year**	**Marks**
1	Explain different types of solar collectors with sketches.	KTU August 2021	6
2	Describe the working of a passive solar energy system with a simple figure.	KTU August 2021	4
3	With neat diagram, explain the components of a solar power tower.	KTU August 2021	6
4	What are the major classifications of solar energy conversion systems?	KTU August 2021	4
5	Explain components and layout of solar wind hybrid energy system.	KTU August 2021	6

6	Compare the vertical axis wind turbines with horizontal axis wind turbines.	KTU August 2021	4
7	Explain the working principle and construction of vertical axis wind turbine with sketches.	KTU August 2021	6
8	List four advantages and limitations of wind energy system.	KTU August 2021	4
9	With the help of a neat sketch, explain the working and construction of central receiver type solar thermal electric power plant with heliostat.	KTU December 2021	10
10	With a neat sketch explain the working of solar flat plate collectors.	KTU December 2021	7
11	List the different types of focussing type solar collectors.	KTU December 2021	3
12	With a neat schematic show the construction of a horizontal axis wind energy conversion system and explain its working.	KTU December 2021	6
13	Elaborate on the construction and working of the different types of vertical axis wind mills with sketches.	KTU December 2021	10
14	What are the benefits of solar energy?	KTU June 2022	5
15	With a neat sketch explain flat plate solar collector.	KTU June 2022	5
16	How do solar photovoltaic (PV) panels work?	KTU June 2022	6
17	Compare between mono-crystalline & poly-crystalline solar panel.	KTU June 2022	4
18	What are the basic components of a wind turbine?	KTU June 2022	6
19	How wind energy is converted to electricity in a wind turbine?	KTU June 2022	4
20	With a neat sketch differentiate between an up-wind and downwind machines.	KTU June 2022	3
21	What is active yaw control in wind turbine?	KTU June 2022	3
22	What is meant by a turbine's swept area?	KTU June 2022	4
Q.No	**Module III**	**Month & Year**	**Marks**
1	Explain any two types of thermo-chemical conversion process of biomass to energy.	KTU August 2021	6

2	Describe the steps involved in alcoholic fermentation process with a process flow chart.	KTU August 2021	4
3	Explain the steps involved in preparation of bio diesel from jatropha with a process flow chart.	KTU August 2021	6
4	Describe any one type of bio gas plant with a neat sketch.	KTU August 2021	4
5	Explain the construction and working of Janta (non-floating type) bio gas plant with the help of a neat sketch.	KTU December 2021	6
6	Discuss briefly about the different steps involved in the conversion of biomass to biogas in a digester.	KTU December 2021	4
7	Explain any one method of bio-chemical conversion of biomass.	KTU December 2021	5
8	Discuss briefly about the trans-esterification process.	KTU December 2021	3
9	Distinguish between pyrolysis and gasification process.	KTU December 2021	2
10	Explain the different bio-chemical conversion of biomass	KTU June 2022	6
11	What is pyrolysis of biomass?	KTU June 2022	4
12	Explain the process of transesterification	KTU June 2022	4
13	With a neat sketch explain the working of fixed dome type digester biogas plant	KTU June 2022	6
Q.No	**Module IV**	**Month & Year**	**Marks**
1	Explain any two types of tidal energy harvesting technologies with sketches.	KTU August 2021	6
2	List out advantages and disadvantages of geothermal energy.	KTU August 2021	4
3	Explain components and working principle of MHD power generation with alayout.	KTU August 2021	6
4	Describe working principle and parts of a fuel cell.	KTU August 2021	4
5	Explain the components and working principle of wind-diesel type of hybrid power plant with a layout.	KTU August 2021	6
6	List the advantages and disadvantages of wave energy.	KTU August 2021	4

7	With a neat sketch explain the working of a vapour dominated geothermal power plant.	KTU December 2021	7
8	What are the advantages of mini and micro hydro power plants over conventional hydro power plants?	KTU December 2021	3
9	With a neat sketch explain the working of a Magneto Hydro Dynamic power generation unit.	KTU December 2021	6
10	List out the various applications of fuel cells.	KTU December 2021	4
11	Explain the different methods to store hydrogen for the energy conversion process.	KTU December 2021	3
12	With the help of a neat sketch, explain the construction and working of a geothermal fossil hybrid power plant.	KTU December 2021	7
13	What is geothermal power?	KTU June 2022	3
14	Explain with a neat sketch the working of Flashed steam Hydrothermal system	KTU June 2022	7
15	What are the basic components of a tidal power plant?	KTU June 2022	3
16	With a neat sketch explain the working of Double basin tidal power plant	KTU June 2022	7
17	How magneto hydro dynamic generators works?	KTU June 2022	3
18	With a neat sketch explain the operation of Open cycle MHD system	KTU June 2022	7
Q.No	**Module V**	**Month & Year**	**Marks**
1	Explain any six causes for the loss of biodiversity.	KTU August 2021	6
2	What are the various steps to be taken to control ozone layer depletion?	KTU August 2021	4
3	Describe the causes and effects of global warming.	KTU August 2021	6
4	List out the environmental impact of hydel power plants.	KTU August 2021	4
5	Describe the wastewater treatment process with neat sketches.	KTU August 2021	6
6	List out the solutions to reduce eutrophication.	KTU August 2021	4

7	List out a few of the primary sources of air pollution and the different methods used to control it.	KTU December 2021	7
8	Explain the phenomenon of thermal pollution.	KTU December 2021	3
9	Describe any wastewater treatment process with neat sketches.	KTU December 2021	6
10	Explain the phenomenon of the greenhouse effect.	KTU December 2021	4
11	Explain briefly about the conditions which will lead to acid rain and also the harmful effects of acid rain.	KTU December 2021	7
11	List any three sources of land degradation.	KTU December 2021	3
12	How the growing consumption of fossil fuels leads to global warming?	KTU June 2022	5
13	What are the causes and effects of ozone layer depletion?	KTU June 2022	5
14	How renewable energies help on sustainable development in the context of current global energy demand?	KTU June 2022	5
15	Briefly explain any four air pollutants and their effects	KTU June 2022	5
16	What are the causes land degradation?	KTU June 2022	5
17	Explain the measures taken to control thermal pollution.	KTU June 2022	5