Model papers

II SEM MAJOR 1

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
Program: II MPREM SEMESTER II

<u>**Major -1**</u> Fundamentals of Renewable Energy Resources

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Time: 2 Hr. 30   **Max. Marks: 50**

SECTION-A

Answer ALL Questions   **5x7 = 35**

1. Explain the classification of energy sources?   **(OR)**

2. Write the importance of renewable energy sources and write their examples of it?

3. Explain the classification of solar cells?   **(OR)**

4. Define solar constant and explain how can you determine it?

5. Write the principle of wind energy conversion and also briefly explain for it? **(OR)**

6. Explain the types of wind turbines?

7. Briefly explain about tidal energy technologies? **(OR)**

8. Explain ocean thermal energy conversion methods?

9. Explain biomass conversion technologies? **(OR)**

10. Explain briefly about wet process and dry process?

SECTION-B

Answer any five from the following Questions   **5x3 = 15**

11. Define energy and write their units of it?

12. Explain green foot print concept briefly?

13. Write the applications of solar PV systems?

14. Explain first generation of solar cells?

15. Write the conditions for site selection to establish a wind turbine?

16. Write the nature of tidal energy?

17. Define bio energy? what are the resources of it?

18. What are the properties of biomass sources?

II SEM MAJOR 2

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
Program: II MPREM SEMESTER II

Major -=2 Mechanics, Wave and Oscillations

Time: 2 Hr. 30 Min.   **Max. Marks: 50**

SECTION – A
Answer ALL questions   (5x7=35)

1.   Define Variable Mass System? Derive an expression for the final velocity of the Rocket

[OR]

2.   Describe Rutherford Scattering Experiment? Derive an expression for Scattering Angle

3.   Define Central Force? Obtain the equation of motion of a body under central force

[OR]

4.   State Kepler's Laws? Prove Kepler's First law of Planetary Motion

5.   Write the short-comings of the Galilean Transformations? Derive equations of Lorentz Transformations of Space and Time

[OR]

6.   Derive the Einstein Mass-Energy Relationship

7.   What are damped oscillations? Obtain equation of motion for a damped oscillator?

[OR]

8.   What are forced oscillations? Derive the equation of motion of a Forced oscillator and find its solution.

9.   What is piezo-electric effect? Describe how ultrasonics are produced by this effect?

[OR]

10.   What are transverse laws of motion of a stretched string? Discuss the modes of vibrations of a stretched string fixed at both ends.

SECTION – B
Answer any FIVE questions   (5x3=15)

11.   What are central forces? Write the characteristics of central forces.

12. Show that the length of a rod moving with relativistic speed, relative to a stationary observer decreases.

13.   State the postulates of special theory of relativity.

14. A Rocket with mass 40 Kg is filled with fuel of mass 360 Kg. Exhaust velocity of gases is 2Km/sec. Find the final velocity attained by the Rocket

15. The Jupiter's period of revolution around Sun is 12 times that of the Earth. Assuming that Planetary orbits are circular. Find how many times the distance between the Jupiter and Sun exceeds that between Earth and Sun?

16. With what velocity should a particle travel so that its relativistic mass increased by 10% of its rest mass

17. The frequency of tuning fork is 300Hz. If its quality factor Q is 5×10^4 Find the time after which its energy becomes 1/10 of its initial value?

18. Define impact parameter and scattering cross section.

III SEM MODULE 3

GOVERNMENT COLLEGE (A), RAJAHMUNDRY

Program: II MPREM SEMESTER III

ELECTRICAL AND ELECTRONICS INSTRUMENTATION

MODEL QUESTION PAPER

Time: 2 Hr. 30 Min.   **MAX MARKS 50M**

SECTION - A

Answer ALL questions   **5×7=35M.**

1.   Derive the expression for current and voltage using L C R series circuit.

                                                    OR

2.   Explain in detail about star and delta connections with a neat diagram.

3.   Give the comparison between different wirings.

                                                    OR

4.   Explain the principle and construction of PMMC.

5.   Explain the construction and working of Full Wave Rectifier (Bridge type).

                                                    OR

6.   What is BJT? Explain how transistor acts as an amplifier.

7.   Explain the construction and working of Lead Acid Battery in detail.

                                                    OR

8.   Explain the principle and working of UPS.

9.   Write about the circuit breaker and explain different types of lamps.

                                                    OR

10.   Explain about the electrical safety rules.

SECTION - B

Answer any FIVE of the questions   **5×3=15M**

11.   Define active power and reactive power.
12.   Write a short note on Soldering.
13.   Write about the working principle of Ammeter.
14.   Explain Zener diode as Voltage Stabilizer.
15.   A Potential difference with frequency of 50Hz is applied to a coil of 1000 ohms an inductance of   2 Henry. Calculate the power factor of the circuit.
16.   A full wave rectifier uses two diodes with load resistance of 100 ohms. Each diode is having negligible forward resistance. Find the efficiency of Full Wave Rectifier.
17.   A potential difference across 24 ohms resistor is 12 volts .What is the current through the resistor.
18.   What are the necessary things to be kept in the First Aid Kit.

IV SEM MODULE 4

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
Program: II MPREM SEMESTER IV
RENEWABLE ENERGY HARVESTING SYSTEMS
MODEL QUESTION PAPER

Time: 2hr. 30min.   **Max. Marks: 50**

SECTION – A

Answer ALL Questions   **5x7 = 35**

1. Describe the spectral distribution of solar radiation and various components of radiation
reaching the earth surface.

[OR]

2. Compare and contrast the construction and working of Pyranometer and Pyrheliometer.

3. Describe the construction and working of flat plate solar thermal collectors.

[OR]

4. Describe about various concentrated solar thermal collectors.

5. Describe the construction and working of solar photovoltaic cell.

[OR]

6. Describe various steps involved in installation, operation and maintenance of solar PV
system.

7. Describe various types of wind turbines.

[OR]

8. Explain the offshore floating windmill technology. What are various challenges involved with it?

9. Describe the anaerobic digestion process.

[OR]

10. Explain about wave energy conversion systems.

SECTION – B

Answer Any FIVE Questions   **5x3 = 15**

11. Define Zenith angle and write about air mass index.
12. Define declination, hour angle and solar azimuth angle.
13. Describe the principle of solar thermal conversion.
14. Write about solar desalinators.
15. Explain the use of bypass and blocking diodes in solar PV modules.
16. Explain the economics and market analysis of SPV systems.
17. Explain the blade design of wind mills.
18. Explain the production of biodiesel.

IV SEM MODULE 5

GOVERNMENT COLLEGE (A), RAJAHMUNDRY
Program: II MPREM SEMESTER IV
ENERGY STORAGE DEVICES
MODEL QUESTION PAPER

Time: 2 Hr. 30 Min.   **MAX MARKS 50M**

SECTION - A

Answer ALL questions   **5×7=35M.**

1. Explain thermo chemical energy storage system.
                                            OR
2.   Define Energy storage. Describe Fly Wheel Storage System.

3. Explain the principle, construction, and working of Li-ion battery.
                                            OR
4. Explain the role of carbon Nano tubes in electrodes.

5. Explain super conducting magnetic energy storage (SMES)
                                            OR
6. Explain principle, construction and working of super capacitor

7. What is a fuel cell? Explain the principle and working of a fuel cell
                                            OR
8. Write the advantages and disadvantages of fuel cell

9. Explain the construction and working of phosphoric acid fuel cell (PAFC).
                                            OR
10. .Explain the construction and working of solid oxide fuel cell (SOFC)

SECTION - B

Answer any FIVE of the questions   **5×3=15M.**

11. Explain the need of energy storage.
12. Write the differences between primary and secondary batteries
13. Write a short note on Capacitors
14. Write the differences between battery and fuel cells.
15. Write about fuel cell efficiency. .
16. Mention the applications of fuel cells.
17. Write a short note on lithium (Li) batteries.
18. Explain hydrogen storage system.

V/VI SEM MODULE 6

Model paper

Solar Thermal, Photo Voltaic and Wind energy Systems

SEMESTER V/VI

Time:2.30 Hrs   **Max Marks :50**

I Answer all from the following questions   **5×7=35**

1. Explain the working of Liquid flat plate collector   OR
2. Explain the classification of concentrating solar collectors
3. Discuss about testing and performance of flat plate collector   OR
4. Determine the working and efficiency of Evacuated-Tubular Collector
5. Classify solar cell based on various parameters   OR
6. Draw IV characteristics of solar cells and explain it's parameters
7. Explain the types of wind turbines   OR
8. Give the Rotor design and Performance analysis
9. Analyze aerodynamics of wind turbines using axial momentum theory   OR
10. Explain the wind driven piston pumps and its limitation.

II Answer any 5 from the following questions   **5×3=15**

11. Explain Thermodynamic limits to concentration of solar radiation
12. Write the applications of solar collectors
13. Explain the effect of dust in flat plate collector
14. Explain energy payback period of solar cell
15. Explain effect of variation of insolation and temperature
16. How do you analyze wind regimes briefly?
17. Determine the torque required for starting a wind driven pump which cylinder diameter 20cm and stoke length 10cm , pumping head is at 10m, stoke of the pump is 0.1m , the crank arm is 0.05m, then find out the force acting on the router shaft due to the weight of the water?
18. Explain the environmental benefits of wind energy?

V/VI SEM MODULE 7

MODEL PAPER
ENERGY MANAGEMENT AND AUDITING
SEMESTER V/VI

TIME:2.30Hrs   **MAX MARKS:50**
  I.   **Answer all from the following questions**   **7×5=35**

  1. Write about Indian energy scenario   (OR)

  2. Discuss various issues related to energy security.

  3. What are various classifications of boilers? (OR)

  4. Explain the performance analysis of boilers.

  5. Explain the energy conservation techniques for transformers. (OR)

  6. Explain the energy efficiency improvement opportunities for electrical motors.

  7. What are provisions for building code in EC Act 2021? (OR)

  8. Explain the working of Wattmeter.

  9. Explain the methodology of detailed energy audit. (OR)

  10. What are data collection hints ? Explain about case study

II Answer any five from the following questions   **3×5=15**

11. Write about Electricity act 2003

12. Write about the energy strategy for future.

13. What are various Parameters for selection of boilers?

14. Explain about Energy conservation in lighting system.

15. Explain about Energy conservation in transmission line.

16. Write about IR Thermometer.

17. Describe a sample worksheet for economic feasibility of energy audit.

18. What are the types of ENERGY AUDIT