P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – VII (C) – Semester – VI
w.e.f. 2017 - 18 ADMITTED BATCH

Course Code : **No. of credits : 03**

Elective Paper VII (C): Renewable Energy

No. of Hours per week: 03 **Total Lectures:45**

UNIT-I (9 hrs)
Introduction to Energy: Definition and units of energy, power, Forms of energy, Energy flow diagram to the earth. Role of energy in economic and social development.
Environmental Effects: Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming,

UNIT-II (9hrs)
Global Energy Scenario: Energy consumption in various sectors, energy resources, coal, oil, natural gas, nuclear and hydroelectric power.
Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, nuclear energy - promise and future, need for use of new and renewable energy sources.

UNIT-III (6hrs)
Solar energy: Spectral distribution of radiation, solar water heating system, Applications, Solar cooker. Solar cell, Types of solar cells.

UNIT-IV (6hrs)
Wind Energy: Introduction, Principle of wind energy conversion, Components of wind turbines, Operation and characteristics of a wind turbine, Applications of wind energy.

UNIT-V (8hrs)
Ocean Energy: Introduction, Principle of ocean thermal energy conversion, Tidal power generation, Tidal energy technologies, Energy from waves.
Hydrogen Energy: Hydrogen production methods - Electrolysis of water, Uses of hydrogen as fuel.

U**NIT-VI (7 hrs)**
Bio-Energy
Energy from biomass – Sources of biomass – Conversion of biomass into fuels – Pyrolysis, gasification and combustion – Aerobic and anaerobic bio-conversion – Properties of biomass – Properties and characteristics of biogas.

References:
1. Solar Energy Principles, Thermal Collection &Storage, S.P.Sukhatme: Tata McGraw Hill Pub., New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, New Delhi.
3. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004,
4. The Generation of electricity by wind, E.W. Golding.

5. Hydrogen and Fuel Cells: A comprehensive guide, Rebecca Busby, Pennwell corporation (2005)
6. Hydrogen and Fuel Cells: Emerging Technologies and Applications, B.Sorensen, Academic Press (2012).
7. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.
8. Fundamentals of Renewable Energy Resources byG.N.Tiwari, M.K.Ghosal, Narosa Pub., 2007.

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III B.Sc Physics Paper – VII C – Semester – VI – Model Paper
w.e.f. 2017 - 18 ADMITTED BATCH

No. of credits : 03

Elective Paper VII(C): Renewable Energy

Note:- Set the question paper as per the blue print given at the end of this model paper.
Time: 2 1/2 Hrs. Max. Marks: 60

Section	Questions to be given	Questions to be answered	Marks
A	5	3	3 x 10M = 30M
B	9	6	6 x 5 M = 30M
Total	14	9	60M

Blue Print

Module	Essay Questions 10 marks	Short Questions 5 marks	Marks allotted
I	1	2	20
II	1	2	20
III	---	2	10
IV	1	1	15
V	1	1	15
VI	1	1	15
Total			95

QUESTION BANK

SUBJECT: PHYSICS **PAPER: VII** **SEMESTER: VI**

RENEWABLE ENERGY

UNIT-I (Introduction to Energy & Environmental effects)

Essay Questions - 10M

1. State law of conservation of energy. Explain different forms of energy.
2. Explain the energy flow diagram to the earth from the sun.
3. Briefly discuss about global warming.
4. Explain the environmental impact of nuclear power of generation.
5. Explain hydroelectric power stations on ecology and environment.

Short Questions - 5M

6. Define energy and power. Write its units.
7. Write a short note on depletion of ozone layer.
8. Explain about air pollution.
9. Explain about water pollution.
10. What is green house effect?

UNIT-II (Global Energy Scenario& Indian Energy Scene)

Essay Questions - 10M

11. Explain the global energy consumption in various sectors.
12. What are the options to generate electricity?
13. Discuss different conventional energy sources available in India.
14. Discuss different non- conventional energy sources available in India.
15. Explain how the energy consumed in urban and rural India.

Short Questions - 5M

16. Explain about fossil fuel.
17. What are the renewable and non renewable energy sources?
18. Why we need new and renewable energy sources.
19. Compare renewable and non renewable energy sources.
20. Explain about fossil fuel.

UNIT-III (Solar energy)

Short Questions - 5M

21. What is solar water heating system? How does it work?
22. Explain about solar energy.
23. What is solar cell? Explain its working principle and draw V-I characteristics.
24. Describe different types of solar cookers.
25. Explain various types of solar cells.

UNIT-IV (Wind Energy)

Essay Questions - 10M

26. What are the components of wind terbine? Explain their operation.
27. What are the characteristics of a wind turbine?

Short Questions - 5M

28. What are the basic principles of wind energy conversion?
29. Write applications of wind energy.

UNIT V (Ocean Energy& Hydrogen Energy)

Essay Questions - 10M

30. Explain the principle and working of tidal power generation.
31. What are the technologies used to obtain tidal energy.
32. Explain Hydrogen production methods.

Short Questions - 5M

33. Explain the principle of ocean thermal energy conversion.
34. Derive an expression for total energy generated from the ocean waves.
35. Write the uses of hydrogen as a fuel.

UNIT –VI (Bio-Energy)

Essay Questions - 10M

36. Explain aerobic and anaerobic bio-conversion.
37. Explain Biomass energy conversion through fermentation-pyrolysis.
38. Explain bio mass conversion through Gasification and Combustion.

Short Questions - 5M

39. Write the properties and characteristics of Biomass.
40. How energy produced from biomass.
41. Explain the sources of biomass.