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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., PHYSICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
V	PART - III	CORE ELECTIVE	U21PH5E1A	ENERGY PHYSICS

Date & Session: 13.11.2024 /FN

Time : 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION - A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	Almost _____ of the energy need of the world are fed by oil. a) 50 b) 40% c) 60% d) 30%
CO1	K2	2.	To transport gas is costlier than transporting _____. a) oil b) coke c) coal d) dung
CO2	K1	3.	The Solar Constant is measured in which unit? a) Joules b) Watts per square meter c) Newtons d) Pascals
CO2	K2	4.	What material is typically used to cover the glass lid of a box-type solar cooker? a) Plastic b) Glass c) Metal d) Wood
CO3	K1	5.	What is the function of the p-n junction in a basic silicon solar cell? a) Reflects sunlight b) Absorbs heat c) Generates electric current d) Stores energy
CO3	K2	6.	What does "PV" stand for in a PV-powered fan? a) Power voltage b) Photovoltaic c) Primary voltage d) Passive ventilation
CO4	K1	7.	What is the primary component of biogas? a) Oxygen b) Methane c) CO ₂ d) Nitrogen
CO4	K2	8.	_____ is the primary product of thermal gasification of biomass. a) Methane b) Ethanol c) Syngas d) Diesel
CO5	K1	9.	In a wind energy collector, the _____ is responsible for converting the kinetic energy of the wind into mechanical energy. a) Generator b) Rotor c) Gearbox d) Tower
CO5	K2	10.	In a fuel cell, _____ is commonly used as the fuel to generate electricity. a) Methane b) Hydrogen c) Ethanol d) Propane

Course Outcome	Bloom's K-level	Q. No.	<p align="center">SECTION – B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)</p>
CO1	K3	11a.	Explain Conventional sources of energy, highlighting their advantages and disadvantages.
CO1	K3	11b.	(OR) Describe how coal is used as a source of energy in India.
CO2	K3	12a.	Define the Solar Constant and Explain how it is measured and its approximate value.
CO2	K3	12b.	(OR) Give the MERITS and LIMITATIONS of a solar cooker.
CO3	K4	13a.	Explain the working principle of a basic silicon solar cell. Include a labeled diagram to support your explanation.
CO3	K4	13b.	(OR) Describe the different types of solar cells commonly used in photovoltaic systems. Compare their materials, efficiency, and typical applications.
CO4	K4	14a.	Discuss the key factors that affect the efficiency of bio digestion in a biogas plant. Explain how each factor influences the rate of biogas production.
CO4	K4	14b.	(OR) Explain the process of producing biogas from plant waste. What are the benefits of using plant waste as a feedstock for biogas generation?
CO5	K5	15a.	Classify wind machines based on their design and orientation. Provide a brief description of each type, highlighting their key features and typical applications.
CO5	K5	15b.	(OR) Discuss the different methods of harnessing energy from oceans. Highlight the principles behind each method and the potential challenges involved in their implementation.

Course Outcome	Bloom's K-level	Q. No.	<p align="center">SECTION – C (5 X 8 = 40 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)</p>
CO1	K3	16a.	Examine India's production and reserves of major natural resources, including coal, natural gas, and oil. Evaluate how these resources influence the country's industrial development, energy security, and economic policies.
CO1	K3	16b.	(OR) Compare coal, oil, and natural gas as energy sources in terms of their availability, environmental impact, efficiency, and role in global energy production. Discuss the advantages and disadvantages of each fuel type.

CO2	K4	17a.	Explain the concept of solar radiation geometry. Discuss the key parameters involved, such as solar declination, hour angle, solar altitude angle, and solar azimuth angle. How do these parameters influence the amount of solar energy received at a given location?
CO2	K4	17b.	(OR) Discuss the various materials used in the construction of flat-plate solar collectors, including the absorber plate, cover, and insulation. Evaluate the properties of each material and their impact on the collector's efficiency, durability, and cost. How do material choices affect the overall performance of the solar collector?
CO3	K4	18a.	Explain the operation of a photovoltaic (PV) powered fan system. Describe the key components involved, including the solar panels, fan motor, and any necessary control systems.
CO3	K4	18b.	(OR) Describe the components and operation of a basic photovoltaic (PV) system for power generation.
CO4	K5	19a.	Explain the working principle of a biogas plant. Describe the key stages of the biogas production process, including feedstock preparation, anaerobic digestion, and biogas collection.
CO4	K5	19b.	(OR) Describe the working principle of a downdraft gasifier. Explain the key processes involved, including gasification, reduction, and combustion.
CO5	K5	20a.	Explain the different types of wave energy conversion devices. Describe the operating principles of each type, such as point absorbers, oscillating water columns, and attenuators.
CO5	K5	20b.	(OR) Discuss the advantages of using batteries for bulk energy storage.