Code No. 6209 / O / S

FACULTY OF ENGINEERING

B.E. 4/4 (Mech.) I – Semester (Old) Examination, July 2014

Subject : Non-Conventional Energy Sources (Elective – I)

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part - A. Answer any FIVE questions from Part - B.

PART – A (25 Marks)

1 Comment on the prospects of fossil fuels in India.
2 How is the per capita energy consumption related with standard of living?
3 Define solar irradiance, solar constant, extra terrestrial and terrestrial radiations.
4 Give a brief classification of solar cells.
5 What range of wind speed is considered favourable for wind power generation?
6 What do you understand by yaw active and yaw fixed machines?
7 What are the major applications of geothermal energy?
8 What is the present status of development of biomass energy resources in India?
9. What are the different types of bio-fuels?
10 What are the main hurdles in the development of tidal energy?

PART – B (50 Marks)

11 a) Discuss different renewable sources of energy with special reference to the Indian context. (5)
b) What are primary and secondary energy sources? (5)

12 a) Write your views on the energy planning issues aiming to bridge the gap between the energy demand and supply situation in India with reference to renewable energy sources. (7)
b) What do you understand by energy audit? Explain its importance in energy conservation. (3)

13 a) Calculate the angle of incidence of beam radiation on a plane surface, tilted by 45° from the horizontal surface and pointing due south, located at Mumbai at 1.30 pm (IST) on 15th November. The longitude and latitude of Mumbai are 72^0 49' E and 18^0 54' N. The standard longitude for IST is 81^0 44' E. (5)
b) Define declination angle, hour angle, zenith angle, solar azimuth angle and angle of incidence. (5)

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14 a) Describe the flat-plate collector with the help of a suitable diagram. (5)
b) Explain with a suitable diagram, the working of a solar photovoltaic power plant. (5)

15 a) Using Betz model of a wind turbine, derive the expression for power extracted from wind. What is maximum theoretical power that can be extracted and under what condition? (6)
b) Evaluate the suitability of various types of generators for wind power generation. (4)

16 a) What are the merits, demerits and major applications of geothermal energy? (5)
b) Explain the different types of biomass gasifiers. (5)

17 a) Explain the working of an open cycle OTEC plant with a neat sketch. (5)
b) Explain the present status of development of ocean energy resources. (5)

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Code No. 6439 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (Mech.) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Conventional Energy Sources (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 What are the merits of non conventional energy sources?
2 What is the total annual energy consumption on India? How much of it is contributed by non conventional energy sources?
3 What are the ways in which solar energy can be stored? Give examples.
4 Define declination, solar azimuth angle, angle of incidence and solar insolation.
5 Name the different types of concentrating collectors.
6 What is meant by solar photoconduction?
7 What are the applications of wind energy?
8 What is meant by bio-diesel? What are its merits?
9 What are the main hurdles in the development of tidal energy?
10 The zone of likely geothermal sites corresponds roughly to _____ (choose the right answer) (a) Cold hilly regions, (h) Hot flat regions, (c) Tropical regions, (d) Regions of seismic and volcanic activities.

PART – B (50 Marks)

11 a) Discuss the main features of various types of renewable and non renewable energy sources.
b) Explain the importance of non conventional energy sources in the context of global warming.

12 a) With a neat diagram, explain the various types of concentrating collectors.
b) Describe the principle and working of a solar distillation plant used for desalination of water.

13 a) Give a detailed classification of solar PV cells.
b) What are the applications of solar PV systems?

14 a) Classify the types of wind turbines. Explain the construction of any one wind turbine with a neat sketch.
b) Discuss briefly the types of generators used in wind power generation.

15 a) What are the main advantages and disadvantages of biomass energy?
b) Explain with a layout, the working of an MSW (Municipal Solid Waste) incineration plant.

16 Explain in detail with neat sketches the various types of geothermal resources and the methods to recover energy from them.

17 a) Explain with a sketch, the construction and working of an open cycle OTEC plant.
b) What are the environmental impacts of using OTEC?

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Code No. 6440 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (Mech.) I - Semester (New) (Suppl.) Examination, July 2014

Subject : Tool Design (Elective-I)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 List out the properties of cutting tool Material.
2 Explain Ballizing process.
3 What are the features to be considered while designing a broach?
4 What are the materials used for Jigs and Fixtures?
5 What are the advantages of plastics as a tooling materials?
6 What is the purpose of the helical flute of twist drill?
7 Write about Forging.
8 Write the properties of Dielectric fluid.
9 Differentiate between end and face milling cutters.
10 Explain the principle of location for circular surface.

PART – B (50 Marks)

11 (a) Explain the working principle of ECM.
(b) List advantages and disadvantages of USM.

12 Design a circular form tool for the job shown in figure 1. The tool material is MS, ∅ 40mm and strength 80kg/mm^2.

13 (a) Draw a neat sketch of Reamer and indicate its standard designation.
(b) Explain the manufacturing process of Taps.

14 (a) Explain the variables that effect the metal flow during Drawing.
(b) Two holes, one 4cm square and another 6cm diameter are to be cut in a metallic sheet 3mm thick. If shear strength of material is 2500 Kg/cm^2, determine cutting force and stripping force.

15 (a) Explain the different types of clamps.
(b) Explain design of fixture for welding.

16 (a) Explain coated carbide tools.
(b) Sketch and explain the geometry of a Pull type broach.

17 Write short notes on any three of the following: (10)
(a) Hydraulic and pneumatic clamping
(b) Honing and Lapping
(c) Grinding of milling cutters
(d) Taps and Dies
(e) Press tool operations

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