Code: 9A03802

1

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

ENERGY SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions.
All questions carry equal marks.

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1 (a) What is extra terrestrial radiation?
(b) With a neat diagram explain the working of sunshine recorder.

2 Why orientation is needed in concentrating type collectors? Describe the different methods of sun tracking.

3 (a) Describe in briefly, the different energy storage methods used in the solar system.
(b) What are the applications of a solar pond?

4 Discuss the advantages and disadvantages of horizontal and vertical axis wind mill. What methods are used to overcome the fluctuatiy power generation of wind mill?

5 (a) How are Gasifiers classified?
(b) What are the techniques suggested for maintaining the biogas production?

6 Draw a neat sketch of possible electricity generation system cycle for geothermal energy conversion and describe them.

7 (a) Explain the closed cycle OTEC system with a neat sketch.
(b) What are the difficulties in tidal power developments?

8 What are the different types of MHD power cycles? Explain any one of them.

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2

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

ENERGY SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions.
All questions carry equal marks.

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1 Classify different solar energy measuring equipments. What is the difference between a pyrheliometer and a pyranometer?

2 (a) With a neat sketch, explain the suitability of solar drier for food grains.
(b) Write short notes on solar pond.

3 (a) With the help of a neat sketch, describe a solar heating system using water heating solar collectors.
(b) Write short notes on solar distillation.

4 (a) Describe horizontal axis type aerogenerators.
(b) Describe the main considerations in selecting a site for wind generators.

5 What is meant by anaerobic digestion? What are the factors which affect biodigestion?

6 Describe the main types of turbines in brief, which may be used for geothermal energy conversion.

7 (a) What is the basic principle of ocean thermal energy conversion?
(b) What are the advantages of small scale hydroelectric power generation?

8 Write short notes on:
(a) Thermoelectric effects.
(b) Selection of thermoelectric materials.
(c) Fuel cells.

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3

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

ENERGY SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions.
All questions carry equal marks.

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1 (a) How solar radiation is measured?
(b) What is meant by renewable energy sources? Explain in brief these energy sources with special reference to Indian context.

2 Enumerate the different types of concentrating type collectors. Describe a collector used in power plant for generation of electrical energy.

3 (a) What is the principle of solar photovoltaic power generation?
(b) What are the advantages and disadvantages of photovoltaic solar energy conversion?

4 What are the advantages of vertical axis machines over horizontal type? Describe a rotor for relatively low velocity wind.

5 (a) Differentiate between wet fermentation and dry fermentation.
(b) How bio-mass conversion takes place?

6 (a) Define a geothermal source.
(b) What are the possible sources of geothermal pollution? How these are avoided?

7 Describe the different types of turbines used for small scale hydroelectric plants.

8 (a) Explain the principle of working of thermo-electric generator.
(b) What are the various losses associated with operation of MHD generator.

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4

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

ENERGY SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) What are the reasons for variation in solar radiation reaching the earth than received at the outside of the atmosphere?
(b) What are the advantages and limitations of renewable energy sources?

2 (a) What is the principle of conversion of solar energy into heat?
(b) What are the main components of a flat plate solar collector, explain the function of each?

3 Describe the layout and working of a continuous solar cooling system. What are its advantages?

4 (a) Derive an expression for power developed due to wind.
(b) Describe with a neat sketch the working of a wind energy system.

5 Explain the constructional details and working of KVIC digester with the help of a neat diagram. Write the applications of biogas.

6 (a) Give a brief note on prospects of geothermal energy in context to India.
(b) What are the applications of geothermal energy?

7 Explain with sketches the various methods of tidal power generation. What are the limitations of each method?

8 (a) Why Carnot cycle is not applicable in the estimation of efficiency of thermoelectric generator?
(b) Explain Seebeck, Peltier and Thomson effects.

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