Code No: **RT42032** **R13** **Set No. 1**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**GREEN ENGINEERING SYSTEMS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

**PART–A** ***(22 Marks)***

1. a) Discuss the features of Solar Photo Voltaic system. [4]
   b) What are the main applications of a solar pond? Describe briefly. [4]
   c) Enumerate the main applications of biogas. [3]
   d) What are the advantages and disadvantages of a fuel cell? [4]
   e) What do you understand by green manufacturing systems? [3]
   f) Explain the role of bamboo and rammed earth in the construction of green buildings. [4]

**PART–B** ***(3x16 = 48 Marks)***

2. a) Why orientation is needed in concentrating type collectors? Describe the different methods of sun tracking. [8]
   b) Estimate the rate at which the sun emits energy. What fraction of this energy is intercepted by the earth and what is the amount intercepted? [8]

3. a) Describe the layout and working of a continuous solar cooling system. [8]
   b) Discuss the advantages and disadvantages of horizontal and vertical axis windmill. [8]

4. a) Discuss different systems used for generating the power using geothermal energy, in brief. [8]
   b) What are the factors, which affect the size of the bio-gas plants? [8]

5. a) Describe the principle of working of a fuel cell with reference to $H_2$-$O_2$ cell. [8]
   b) Discuss the relevance of energy efficient technologies in HVAC systems. [8]

6. Explain in detail, the environmental impact of current manufacturing practices and systems. [16]

7. a) Elaborate the green building concept. Give any one example of green building. [8]
   b) Explain the different roofing systems used in green buildings. [8]

Code No: **RT42032** **R13** **Set No. 2**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**GREEN ENGINEERING SYSTEMS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

**PART–A** ***(22 Marks)***

1. a) Discuss the main applications of Solar Photo Voltaic system? [4]
   b) Write notes on Solar distillation. [4]
   c) What is bio-mass? How it is useful? [3]
   d) Write short notes on the applications of fuel cell. [3]
   e) Discuss about alternate casting techniques. [4]
   f) Explain the role of timber and lime pozolana cement in the construction of green buildings. [4]

**PART–B** ***(3x16 = 48 Marks)***

2. a) How does a Photo Voltaic cell works? Explain with suitable diagram. [8]
   b) Enumerate the different types of concentrating type collectors. Describe a collector used in power plant for generation of electrical energy. [8]

3. a) With the help of a neat sketch, describe a solar heating system using water heating solar collectors. What are the advantages and disadvantages of this method? [8]
   b) Discuss the methods which are used to overcome the fluctuating power generation of windmill? [8]

4. a) Explain the principle of open cycle OTEC system with suitable diagram. [8]
   b) Explain the production of bio-gas. What are the factors which affect the generation of biogas? [8]

5. a) What is the principle of fuel cell? Discuss problems associated with operation of fuel cell. [8]
   b) Give an account of different lighting technologies. [8]

6. Discuss the design and implementation of efficient and sustainable green production system with an example. [16]

7. a) Discuss the necessity of understanding the basic concept of green buildings. [8]
   b) Describe energy management system and its importance. [8]

Code No: **RT42032** **R13** **Set No. 3**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**GREEN ENGINEERING SYSTEMS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

**PART–A** ***(22 Marks)***

1. a) Discuss the limitations of solar photovoltaic system. [3]
   b) Write notes on Solar chimney. [4]
   c) What are the different sources of geothermal energy? [4]
   d) How fuel cells are the future option for our energy needs? Justify your answer. [4]
   e) Discuss the benefits of green manufacturing systems. [3]
   f) Explain the role of hollow blocks and agro materials in the construction of green buildings. [4]

**PART–B** ***(3x16 = 48 Marks)***

2. a) Explain the working of pyranometer with the help of a neat sketch. [8]
   b) What are the main components of a flat plate solar collector, explain the function of each. [8]

3. a) Describe in brief, the different energy storage methods used in the solar system. [8]
   b) What is the basic principle of wind energy conversion? Derive the expression for power developed due to wind. [8]

4. a) State the limitations of OTEC system. [8]
   b) What is meant by anaerobic digestion? What are the factors, which affect bio-digestion? Explain briefly. [8]

5. a) Write short notes on compressed air storage. [8]
   b) What are variable frequency devices? Mention their benefits over other devices. [8]

6. Explain the selection of environment friendly materials in manufacturing. [16]

7. a) Discuss the features and benefits of green buildings. [8]
   b) Explain the different sustainable practices used in the planning of green buildings for mass comfort. [8]

Code No: **RT42032** **R13** **Set No. 4**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**GREEN ENGINEERING SYSTEMS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

**PART–A** ***(22 Marks)***

1. a) What are the major components of photovoltaic systems? [4]
   b) Write notes on Solar cooking. [3]
   c) How bio-energy may be useful for rural applications? Justify your answer. [4]
   d) Write short notes on the types of electrodes for a fuel cell. [4]
   e) Discuss in detail about alternate joining techniques. [3]
   f) Explain the role of ferro-concrete and industrial waste in the construction of green buildings. [4]

**PART–B** ***(3x16 = 48 Marks)***

2. a) Explain the Angstrom compensation pyrheliometer, with the help of a neat sketch. [8]
   b) What are the advantages and disadvantages of concentrating collectors over flat plate collectors? [8]

3. a) What is the principle in the collection of solar energy used in a non-convective solar pond? Describe a non-convective solar pond for solar energy collection and storage. [8]
   b) Describe with a neat sketch the working of a wind energy system with main components. [8]

4. a) Explain with the help of diagram, the principle of closed cycle OTEC system. [8]
   b) Explain the constructional detail and working of KVIC digester. [8]

5. a) Write short notes on pumped hydro electric storage. [8]
   b) Discuss the aims and scopes of demand site management. [8]

6. a) Discuss the advantages and disadvantages of green manufacturing systems over other systems? [8]
   b) What is zero work manufacturing? Explain in detail. [8]

7. a) Explain in detail the sustainable site selection for green buildings. [8]
   b) Write short notes on the paints to reduce the heat gain of the buildings. [8]