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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

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
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PART–A *(22 Marks)*

1. a) Explain the variation in sun declination in a year. [4]
   b) Differentiate between sensible and latent heat. [4]
   c) What is fermentation of biomass? [4]
   d) What are the two types of hydrogen fuel cells? [4]
   e) What is Carbon neutral? [3]
   f) What is Ferro cement? [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain in detail the factors responsible for variation in extraterrestrial radiation. [8]
   b) Compute the radiation striking on a inclined surface. [8]

3. a) Explain with a simple sketch, working of a solar pond with its limitations. [8]
   b) Discuss briefly the typical performance characteristics curves of wind machines. [8]

4. a) What are the advantages of anaerobic digestion, explain them in detail? [8]
   b) Explain with a schematic diagram, working of liquid dominated total flow geothermal system. [8]

5. a) Briefly discuss the selection criteria of luminaries for an industry. [8]
   b) Explain with a simple sketch, construction and working of molten carbonate fuel cell. [8]

6. a) Briefly discuss factors influencing industrial growth on environment. [8]
   b) Explain why vegetable based cutting fluids are replacing conventional cutting fluids? [8]

7. a) Explain are the factors influencing site selection of green building. [8]
   b) What are the essential properties of building materials? [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May- 2019

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

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PART–A ***(22 Marks)***

1. a) What are the factors influencing diffuse radiation on earth surface? [4]
   b) What are the typical characteristics of Savonius rotor system? [4]
   c) Define photosynthesis efficiency. [3]
   d) What is power factor improvement? [3]
   e) What are benefits of green manufacturing systems? [4]
   f) Composition of lime pozzolana cement. [4]

PART–B ***(3x16 = 48 Marks)***

2. a) Explain with a simple sketch, construction and working of pyreheliometer. [8]
   b) What are the relative advantages of concentrating collectors over flat plate collectors? [8]

3. a) What are the general aspects of solar active heating of buildings? [8]
   b) What are the design considerations of a horizontal axis wind machine? [8]

4. a) Briefly explain the factors which influence generation of gas from biomass. [8]
   b) Explain with a simple sketch the basic principle of tidal power generation. [8]

5. a) Explain briefly how variable frequency drives are more energy efficient than conventional motor drives. [8]
   b) Briefly discuss classification of fuel cells. [8]

6. a) Explain the need for identifying recyclable materials in manufacturing. [8]
   b) What are the relative advantages of advanced joining techniques over conventional techniques? [8]

7. a) Explain how hollow blocks can be an alternate to conventional bricks used in construction? [8]
   b) Explain briefly how alternate roofing systems can lead to energy savings? [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

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
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PART–A *(22 Marks)*

1. a) Define solar constant. [3]
   b) What is passive heating of buildings? [4]
   c) What are the relative advantages of biomass gasifiers? [4]
   d) What is comfort air-conditioning? [4]
   e) Define productivity. [3]
   f) Advantages of Ferro concrete. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain how diffuse radiation can be measured and factors affecting accuracy of measurement. [8]
   b) What are PV cells and explain briefly how they can be used for energy conversion? [8]

3. a) Explain with a simple sketch, working of a typical solar drying bin. [8]
   b) Explain the functions of components in a wind electric system. [8]

4. a) What are the advantages and disadvantages of floating drum bioconversion plant? [8]
   b) Explain with relevant schematic diagram, working of hybrid OTEC cycle. [8]

5. a) Explain why efficient lighting systems are gaining importance in industries and commercial sectors. [8]
   b) Briefly explain the basic design and working of a fuel cell. [8]

6. a) What are the basic mechanical properties considered while selection of environmentally friendly materials? [8]
   b) Explain in detail zero waste manufacturing systems. [8]

7. a) Explain how bamboo and timber can be used as construction materials. [8]
   b) Explain how selective paints can reduce heat gain in buildings. [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

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

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PART–A ***(22 Marks)***

1. a) What is latitude, longitude and prime meridian? [4]
   b) List the factors which determine output from a wind energy convertor. [4]
   c) Significance of bio-fouling in OTEC plants. [4]
   d) Define conversion efficiency of fuel cell. [4]
   e) Application of vegetable based cutting fluids. [3]
   f) Define what is maximum comfort? [3]

PART–B ***(3x16 = 48 Marks)***

2. a) What are the major advantages of solar cells over conventional power generation? [8]
   b) Briefly discuss I-V characteristics of PV cells. [8]

3. a) What are the forces on blades and thrust on turbines, explain them in detail? [8]
   b) Explain with a simple sketch, working of central power receiving system. [8]

4. a) What are the different types of bio gas plants, explain them briefly? [8]
   b) Explain with simple sketch how wave energy conversion systems be used for power generation. [8]

5. a) Explain Why efficient HVAC systems are gaining importance in industries and commercial sectors. [8]
   b) Briefly discuss how energy efficient pumps can contribute towards conservation of energy. [8]

6. a) What are the benefits of green manufacturing systems? Explain them in detail. [8]
   b) What are the relative advantages of alternate casting over conventional casting techniques? [8]

7. a) Explain how agro and industrial waste can be used in green buildings. [8]
   b) Briefly discuss the concept of energy management in green buildings. [8]