BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER : VIII**
BRANCH: FOOD TECHNOLOGY **SESSION : SP/19**

SUBJECT: SAF2013 RENEWABLE ENERGY FOR FOOD PROCESSING

TIME: 3.00 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Explain any two unit operations involved in food preserving technologies and their energy sources and consumption. [6]

Q.1(b) Explain in brief [6]
a) Energy consumption by the end user in food industry for the process heat availability.
b) Renewable energy usage by the food processing industry for the heat availability.

Q.2(a) Explain the principle of conversion of solar energy into heat. [4]

Q.2(b) Enumerate different types of concentrating type collectors. Describe a collector used in power in power plant for generation of electricity. [8]

Q.3(a) Explain in brief of VCRS and VARS refrigeration system with neat schematics. [6]

Q.3(b) Construct the VARS solar space cooler with LiBr-Water and write the advantages and disadvantages. [6]

Q.4(a) Prove that in case of horizontal axis wind turbine the maximum power can be obtained when exit velocity = (1/3) wind velocity. [6]

Q.4(b) Wind at 1 standard atmospheric pressure and 15°C has a velocity of 15 m/s, calculate [6]
a) A reasonably obtainable power density (by assuming minimum efficiency).
b) The total power.
c) The torque and axial thrust.

Q.5(a) Explain screw extrusion technology for making briquetting with the help of forces acting between the particles during the compression. [6]

Q.5(b) Describe the types of conversion of waste into energy by using incineration process. [6]

Q.6(a) What is meant by gasification? What are the factors affecting the gasification? Explain in brief. [3]

Q.6(b) Explain the various types of gasifiers with reactions takes place in different zones. [9]

Q.7 Discuss the different unit operations involved in any food industry and their energy usage of conventional and non-conventional sources. Suggest the alternates of consumption of fossil fuels. [12]

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