

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), Nov.-Dec. 2015

B. Tech in Mechanical Engineering, Semester VII

Roll No.....

ME 733 : Renewable Energy

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Which of the following is not a Primary Energy Source?
a) Oil b) Natural Gas c) Electricity d) Wood
- ii. Which of the following States in India does not have proven coal reserve?
a) Andhra Pradesh b) Madhya Pradesh c) Kerala d) West Bengal
- iii. The nodal agency for coordinating the energy conservation activities under EC act in India is
a) Bureau of Indian Standards b) Bureau of Energy Efficiency
c) Bureau of Energy Education d) Bureau of Energy and Environment
- iv. Energy available in fuels is stored as
a) Heat Energy b) Chemical Energy c) Atomic Energy d) Explosive Energy
- v. Solar radiation that is received after it changes its direction due to reflection and scattering in the atmosphere is called
(a) Diffused radiation (b) Scattered radiation (c) Beam radiation (d) Radiation
- vi. Wind turbines using aerodynamic lift produce more energy for a given area than wind turbines using aerodynamic drag as the
(a) Lifting force pushes the blade in the direction of the wind
(b) Lifting force is roughly perpendicular to the local flow fields
(c) Lifting force produces more torque
(d) Drag services capture more energy because of greater friction on the blade surfaces
- vii. Biomass can be used as fuel through
(a) Combustion (b) Fermentation (c) Digestion (d) All of the above
- viii. Which of the following fuel does not give ash as residue when burned?
(a) Wood (b) Charcoal (c) Biogas (d) Coal
- ix. The Ocean thermal energy conversion system that is meant to generate power is most suitable in
(a) Sub-tropical region (b) Tropical region
(c) Cold region (d) Moderate climate region
- x. The overall efficiency of an OTEC power plant is
(a) 2-3% (b) 10-15% (c) 15-20% (d) 20-25%

- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- Write any four differences between renewable and non-renewable sources.
 - What are the different forms of energy?
 - State any five factors on which site selection of thermal power plant depends.
 - Explain how electrical energy can be generated from geothermal energy.
- Q.3A State any four desirable properties of good moderator. State any four desirable properties of control rod. 05
- Q.3B Explain how electrical energy can be generated in single basin two way cycle of tidal power 05
- Q.4A Write short note on Power generation using solar tower concept. 05
- Q.4B What are the main components of a flat plate solar collector, explain the function of each? 05
- Q.5A Explain the terms: i. Yaw control ii. Pitch control 05
- Q.5B Why a tall tower is essential for mounting a horizontal axis wind turbine? 05
- Q.6 Explain about the applications of solar PV system in rural areas. 10
- OR
- Q.6 What are the advantages and limitations of wave energy conversion? 10
- Q.7A What are the advantages and disadvantages of a fuel cell? 05
- Q.7B List out different methods of hydrogen energy storage. 05
- OR
- Q.7B Explain with neat sketch, any one method of operation of tidal power generation. 05
- Q.8 Explain the working of solar drier and solar still with neat sketches and block diagrams for both. 10
- Q.9A What are the total binding energy and binding energy per nucleon for ${}^{12}_6\text{C}$ nucleus? Take suitable values. 10
- Q.9B A single basin type power plant has a basin area of 2 sq km. The tide has an average range of 13 m. Power is generated only during the ebb cycle. The turbine stops operating when the head on it falls below 3 m. calculate the average power generated by the plant in single emptying process of the basin if the turbine efficiency is 0.7. Estimate the average annual energy generation of the plant. 10
- OR
- Q.9B Calculate the no of daylight hours (sunshine hours) in Srinagar on January 1 and July 1. The latitude of Srinagar is $35^{\circ}05' \text{ N}$. 10