

**RENEWABLE ENERGY TECHNOLOGY
(BIOT 4241)**

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Bio-char production is maximum in which Pyrolysis process
 - (a) Slow
 - (b) Fast
 - (c) Flash
 - (d) Intermediate
- (ii) B5 indicates a blend with
 - (a) 5% biodiesel and 95% diesel fuel
 - (b) 95% biodiesel and 5% diesel fuel
 - (c) 50% biodiesel and 50% diesel fuel
 - (d) None of these
- (iii) The sequence of anaerobic fermentation of methane production process
 - (a) hydrolysis→acidogenesis→acetogenesis→methanogenesis
 - (b) hydrolysis→acetogenesis →acidogenesis →methanogenesis
 - (c) methanogenesis →acidogenesis →acetogenesis →hydrolysis
 - (d) hydrolysis→acetogenesis→acidogenesis→methanogenesis
- (iv) Which of the following method of hydrogen production does not require light
 - (a) Direct biohydrolysis
 - (b) Indirect biohydrolysis
 - (c) Two-step fermentation
 - (d) None of these
- (v) Which of the following part of corn consist of maximum amount of starch
 - (a) germ
 - (b) tip cap
 - (c) pericarp
 - (d) endosperm
- (vi) _____ % of the sun's energy is absorbed by the earth.
 - (a) 50%
 - (b) 0%
 - (c) 40%
 - (d) 10%
- (vii) Which of the statements is correct about solar energy?
 - (a) It is renewable and conventional source of energy
 - (b) It is non-renewable and non-conventional source of energy
 - (c) It is renewable and non-conventional source of energy
 - (d) None of the above

- (viii) Why is a transparent cover used in flat bed collector?
 (a) To maximise transmission of the incident sunlight into box
 (b) To minimise transmission of incident sunlight into box
 (c) To entirely reflect the incident sunlight back
 (d) To ensure partial transmission of the incident sunlight into the box
- (ix) Which Uranium isotope is used in nuclear power plants?
 (a) U-255 (b) U-234
 (c) U-236 (d) U-218
- (x) Which energy is developed by the gravitational pull of sun and moon
 (a) Wind Energy (b) Wave Energy
 (c) Tidal Energy (d) None of the above

Fill in the blanks with the correct word

- (xi) The oil is considered to be heavier than water if the API gravity is _____.
 (xii) Carbonization is a part of _____pyrolytic process
 (xiii) Hydro power plants convert _____energy of falling water into electricity.
 (xiv) Batteries used in car _____.
 (xv) The fungus which helps in the production of bio-ethanol is _____.

Group - B

2. (a) What do you mean by Renewable Energy? What are the different types of Renewable Energy? [[C01](Remember/LOCQ)]
 (b) What do you mean by Ash in a Biomass? What role does it play in combustion of biomass? How can you determine the Ash in a Biomass? [[C01](Remember/LOCQ)]
 (c) What is a fast pyrolysis? [[C02](Apply/IOCQ)]
(1 + 2) + (1.5 + 1.5 + 2) + 4 = 12
3. (a) What do you mean by Fixed carbon in a Biomass? What role does it play in combustion of biomass? How can you determine the Fixed carbon in a Biomass? [[C02](Analyse/IOCQ)]
 (b) State the applications of biodiesel as a fuel. [[C02](Remember/LOCQ)]
(1.5 + 1.5 + 3) + 6 = 12

Group - C

4. (a) Explain why lighter crude oil is more expensive? [[C02](Analyse/IOCQ)]
 (b) Describe the biochemical processes in biogas production. [[C03](Describer/HOCQ)]
 (c) State the factors effecting the biogas production. [[C03](Apply/IOCQ)]
3 + 5 + 4 = 12
5. (a) Describe the simultaneous saccharification and fermentation processes in bio-ethanol production. Briefly state its advantages. [[C03](Discuss/HOCQ)]

- (b) Explain the hydrogen production by electrolytic cell. [[C03](Explain/HOCQ)]
(3 + 3 + 2) + 4 = 12

Group - D

6. (a) Decipher the modus operandi of alkaline batteries. [[C05](Evaluate/HOCQ)]
 (b) Analyse the problems associated with using fusion as energy source. [[C05](Analyze/IOCQ)]
6 + 6 = 12
7. (a) Which is the most efficient solar cell? Justify your answer. [[C05](Justify/HOCQ)]
 (b) Discuss about the various application of solar cells. [[C05](Remember/LOCQ)]
 (c) Decipher the three main stages of electricity production. [[C05](Evaluate/HOCQ)]
4 + 4 + 4 = 12

Group - E

8. (a) What are the different types of Geothermal energy sources? [[C06](Analyze/IOCQ)]
 (b) What are chain reactions of nuclear energy and how it can be contained. [[C06](Remember/LOCQ)]
6 + 6 = 12
9. (a) How tidal energy can be used for electricity production? What are its advantage and disadvantages? [[C06](Apply/IOCQ)]
 (b) Distinguish between the three modes of wave power design. [[C06](Remember/LOCQ)]
6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	31.3	36.4	32.3

