Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Agriculture
End Sem Examination May-2024
AG3CO27 Renewable Energy & Green Technology

Programme: B.Sc. (Hons.) Branch/Specialisation: Agriculture

Duration: 3 Hrs. **Maximum Marks: 50**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. The conventional source of energy is also called _____. **1**
(a) Finite energy (b) Renewable energy
(c) Non-renewable energy (d) Infinite energy

ii. Conventional energy sources constitute _____. **1**
(a) Biomass (b) Fossil fuels
(c) Wind energy (d) Hydropower

iii. _____ is an organic carbon-based matter obtained from plants. **1**
(a) Biomass (b) Alcohol
(c) Biofuel (d) Biodiesel

iv. _____ is obtained by partial combustion of wood or any cellulose organic material of plant origin. **1**
(a) Biogas (b) Biodiesel
(c) Producer gas (d) Charcoal

v. Sunlight is composed of tiny energy capsules called _____. **1**
(a) Radiation (b) Spectrum
(c) Irradiance (d) Photons

vi. Solar radiation received on the earth's surface without change in direction, is called_____. **1**
(a) Beam radiation (b) Diffuse radiation
(c) Ultraviolet radiation (d) Infrared radiation

vii. A semiconductor when doped by a donor impurity increases electrons in the conduction band and become _____. **1**
(a) P- type material (b) P-N junction
(c) N type material (d) Valence band

viii. _____is defined as the ratio of energy collection rate to the collection rate if the absorber plate were at the local fluid temperature. **1**
(a) Heat removal factor (b) Collector efficiency factor
(c) Collector efficiency (d) Thermal efficiency

ix. Betz criterion for an 'ideal' turbine of _____ **1**
(a) 16/27 (b) 14/25 (c) 12/23 (d) 18/27

x. Wind speed varies considerably with height above ground; this is referred to as _____. **1**
(a) Wind loss (b) Wind shear
(c) Wind power (d) Wind strength

Q.2 i. Define renewable energy. **1**
ii. Exemplify the non-conventional energy sources. **2**
iii. Compare conventional and non-conventional energy sources. **5**
OR iv. Explain with examples of the application of renewable energy in agriculture in present context. **5**

Q.3 i. Which is the main constituent of biogas? **1**
ii. Write down the chemical stages in various zones in gasifier. **3**
iii. Differentiate floating drum and fixed dome type biogas plant. **4**
OR iv. Classify gasifiers and explain working of downdraft gasifier. **4**

Q.4 i. Define diffuse radiation. **2**
ii. Explain the working of thermosyphon type solar water heater. **6**
OR iii. Differentiate liquid flat plate collector and evacuated tube collector. **6**

Q.5 i. Define solar distillation. **2**
ii. Classify solar dryers. **2**
iii. Explain the working of box type solar cooker. **4**
OR iv. Explain working of photovoltaic cell. **4**

Q.6 Attempt any two:
i. Compute the expression for power developed due to wind. **4**
ii. Explain the wind energy conversion system with neat sketch. **4**
iii. Differentiate between Savonius and Darrieus rotor. **4**

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Marking Scheme

Renewable Energy & Green Technology (T) - AG3CO27 (T)

Q.1	i.	The conventional source of energy is also called _____. (c) Non -Renewable energy	**1**
	ii.	Conventional energy sources constitute _____. (b) Fossil fuels	**1**
	iii.	_____ is an organic carbon-based matter obtained from plants. (a) Biomass	**1**
	iv.	_____ is obtained by partial combustion of wood or any cellulose organic material of plant origin. (c) Producer gas	**1**
	v.	Sunlight is composed of tiny energy capsules called _____. (d) Photons	**1**
	vi.	Solar radiation received on the earth's surface without change in direction, is called_____. (a) Beam radiation	**1**
	vii.	A semiconductor when doped by a donor impurity increases electrons in the conduction band and become _____. (c) N type material	**1**
	viii.	_____is defined as the ratio of energy collection rate to the collection rate if the absorber plate were at the local fluid temperature. (b) Collector efficiency factor	**1**
	ix.	Betz criterion for an 'ideal' turbine of _____ (a) 16/27	**1**
	x.	Wind speed varies considerably with height above ground; this is referred to as _____. (b) Wind shear	**1**
Q.2	i.	Define renewable energy Definition - 1 mark	**1**

	ii.	Exemplify the non conventional energy sources Enlist non conventional energy sources – 1 mark Examples of non conventional energy sources – 1 mark	**2**
	iii.	Compare conventional and nonconventional energy sources About conventional energy sources - 2.5 marks About nonconventional energy sources – 2.5 marks	**5**
OR	iv.	Explain with examples the application of renewable energy in agriculture in present context. Application of renewable energy in agriculture – 2.5 marks Examples – 2.5 marks	**5**
Q.3	i.	Which is the main constituent of biogas? Name of main constituent of biogas – 1 mark	**1**
	ii.	Write down the chemical stages in various zones in gasifier. Chemical reactions in two zones of gasifier – 3 marks	**3**
	iii.	Differentiate floating drum and fixed dome type biogas plant About floating drum biogas plant – 2 marks About fixed dome biogas plant – 2 marks	**4**
OR	iv.	Classify gasifiers and explain working of downdraft gasifier. Gasifiers classification – 1 mark Working of downdraft gasifier -2 marks Diagram of downdraft gasifier – 1 marks	**4**
Q.4	i.	Define diffuse radiation Definition – 2 mark	**2**
	ii.	Explain the working of thermosyphon type solar water heater working of thermosyphon type solar water heater - 4 marks diagram of thermosyphon type solar water heater – 2 marks	**6**
OR	iii.	Differentiate liquid flat plate collector and evacuated tube collector About liquid flat plate collector – 3 marks About evacuated tube collector – 3 marks	**6**
Q.5	i.	Define solar distillation Definition – 2 marks	**2**
	ii.	Classify solar dryers Types of solar dryers – 2 marks	**2**

iii. Explain the working of box type solar cooker **4**
working of box type solar cooker – 3 marks
Diagram of box type solar cooker – 1 mark

OR iv. Explain working of photovoltaic cell **4**
working of photovoltaic cell – 3 marks
diagram of photovoltaic cell – 1 mark

Q.6 Attempt any two:

i. Compute the expression for power developed due to wind **4**
General description – 1 mark
Steps for expression of power developed due to wind – 3 marks

ii. Explain the wind energy conversion system with neat sketch. **4**
wind energy conversion system with its components – 3 marks
diagram – 1 mark

iii. Differentiate Savonius and Darrieus rotor. **4**
About Savonius rotor – 2 marks
About Darrieus rotor – 2 marks