

BACHELOR OF VOCATION
Solar Technology
Subject: Solar Radiation
Subject Code: ST-605
Semester: Third
January 2021
Theory (External): 35 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number											

SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)

(10x1=10 Marks)

- A** The amount of energy received in unit time on a unit area perpendicular to the sun's direction at the mean distance of the earth from the sun is called _____
- (a) Solar radiation
 - (b) Solar constant
 - (c) Intensity of solar radiation
 - (d) Air Mass
- B** Path length of radiation through the atmosphere to the length of path when the sun is at zenith is called _____
- (a) Declination
 - (b) Air mass
 - (c) Azimuth
 - (d) Solar Constant
- C** Which phenomenon is related to the term radiation?
- (a) magnetic phenomenon
 - (b) gravity
 - (c) electromagnetic phenomenon
 - (d) none of the above
- D** What is the approximate wavelength range of thermal radiation?
- (a) Pressure
 - (b) Watts/square meter
 - (c) Joules/square meter
 - (d) Torque
- E** Which of the following is used to measure extraterrestrial radiation?
- (a) (i) and (ii) are correct
 - (b) (i), (ii) and (iii) are correct
 - (c) Only (ii) is correct
 - (d) (i), (iii) and (iv) are correct

- F Why does the extraterrestrial radiation received by earth vary throughout the year?
- G What is albedo?
- H Solar radiation which reaches the surface without scattering or absorbed is called _____
(a) Beam Radiation
(b) Infrared radiation
(c) Ultraviolet radiation
(d) Diffuse radiation
- I What does the ratio of the mass of water vapour to mass of air indicate?
(a) Absolute humidity
(b) Specific humidity
(c) Relative humidity
(d) Approximate humidity
- J Which of the following indicates the correct order of the principal layers of the earth's atmosphere from top to bottom?
(a) Troposphere – Stratosphere – Mesosphere – Thermosphere – Exosphere
(b) Thermosphere – Stratosphere – Troposphere – Mesosphere – Exosphere
(c) Exosphere – Thermosphere – Mesosphere – Stratosphere – Troposphere
(d) Exosphere – Mesosphere – Thermosphere – Stratosphere – Troposphere

SECTION –B (ESSAY TYPE QUESTIONS)

(5x5=25 Marks)

- Q1 Define Solar radiation, Solar irradiance (Power), Solar irradiation (energy) and Peak sun hours.
- Q2 Determine the spectral existence of a body by using plank's law, if the wave length is given as 456m and the absolute temperature is 765K.
- Q3 (a) What is the approximate spectral composition of the Sun's radiation before it interacts with Earth's atmosphere?
(b) Are all wavelengths of solar radiation transmitted equally through Earth's atmosphere? Explain with sketch.
- Q4 Write the characteristics of black body radiation. Also discuss the wavelength interval with diagram.
- Q5 (a) What do you mean by relative optical ozone mass and relative optical aerosol mass?
(b) What is the relative optical path length? Write its usefulness.
- Q6 What is the average range of solar radiation received on the earth's surface during a day? Define concentration ratio of a solar collector.
- Q7 (a) Explain the depletion process of solar radiation as it passes through the atmosphere to reach at the surface of the earth.
(b) Describe percentage wise distribution of various components in extra- terrestrial solar radiation.
- Q8 Discuss the direct spectral irradiance and Global spectral irradiance on the ground.

*******END OF THE PAPER*******