MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH PROCTORED ONLINE MAKEUP EXAMINATIONS, FEBRAUARY 2022

SOLAR PHOTOVOLTAICS [ELE 4304]
(OPEN ELECTIVE)

Time: 75 Minutes + 10 Minutes **Date: 01 MARCH 2022** **Max. Marks: 20**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Time: 75 minutes for writing + 10 minutes for uploading.

1A. Find the angle subtended by beam radiation with the normal to a flat plate collector at 9 a.m for the day on November 15, 2003. The collector is in Delhi (28^0 35' N, $77^0$12' E), inclined at an angle of 36' with the horizontal and is facing due south. ***(04)***

1B. Describe the design principle of box type solar cooker with a neat diagram, mention its applications. ***(03)***

1C. Describe how distilled water is extracted from the sea water using solar distillation with a neat diagram. ***(03)***

2A. Mention the different components and describe the design principle of solar street lighting with a neat diagram. ***(03)***

2B. A house has the following electrical appliances usage:

a. One 20 watts LED lamp used 6 hours/day
b. One 60 watt fan used for 8 hours/day
c. One 75 watt refrigerator that runs 24 hours/day with compressor running 12 hours/day

Estimate the following:

i. Determine the power consumption demand
ii. Size of PV Panel
iii. No of PV Panel with panel voltage is 110 v
iv. Inverter sizing
v. Battery capacity for 3 days ***(04)***

2C. Describe the Maximum power point tracking systems (MPPT) working principle with a block diagram, I-V Characteristics & power curve. ***(03)***