BIRLA INSTITUTE OF TECHNOLOGY
MESRA – 835215, RANCHI, INDIA

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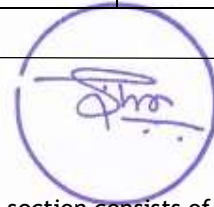Name: …………………………………………. Roll No.: …………………………………..

Branch: …………………………………………. Signature of Invigilator: …………………

Semester: VIth   Date: 26/04/2022 (MORNING)

Subject with Code: ME373 DESIGN MODELING & APPLICATION OF SOLAR ENERGY

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE

1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.

2. The booklet will be distributed to the candidates before 05 minutes of the examination. **Candidates should write their roll no. in each page of the booklet.**

3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.

4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.

5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.

6. Write on both side of the leaf and use pens with same ink.

7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.

8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.

9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.

10. Always maintain the highest level of integrity. Remember you are a BITian.

11. Candidates need to **submit the question paper cum answer sheets before leaving the examination hall**.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI				
(END SEMESTER EXAMINATION)				
CLASS:	B. Tech			SEMESTER : VI
BRANCH:	Mechanical Engineering			SESSION : SP/22
SUBJECT: Design, Modelling and Application of Solar (ME373)				
TIME:	10 AM-12 PM			FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 30 questions each of 1 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Objective Questions

1). Which Meter is used to measure the Beam Radiations _____
A Pyrheliometer B. Sunshine Recorder C. Anemometer D. All of the above

2). How many types of solar cells?
A. One B. Two C. Three D. Four

3). In which collector the efficiency is maximum _____
A. Flat Plate B. Line Focusing C. Evacuated Tube D. Paraboloid Dish

4). The solar cell efficiency is about _____
A.25% B.15% C.48% D.63%

5). The source of energy used for satellites is _____
A. Solar Cells B. Edison Cells C. Fuel Cells D. Cryogenic Cells

6). The Pyranometer measures _____
A. Direct Radiation B. Diffusion Radiation C. Both a and b D. None of the above

7). The single solar cell voltage is about _____
A.0.2 V B.0.5 V C.1.0 V D.2.0 V

8). The solar heater function is to convert the solar energy in to _____
A. Radiation B. Electrical Energy C. Thermal Energy D. None of the above

9). The solar heater life span is around _____
A.4-5 years B.2-6 years C.1-2 years D.6-7 years

10). The radiation of solar includes _____
A. Ultraviolet light and Visible light B. Radio waves and Infrared waves C.X rays and Gamma rays D. All of the above

11). Which cell is used to converts solar energy directly into electrical energy _____
A. Dry cell B. Photoelectric cell C. Battery D. None of the above

12). Which of the following is the most dangerous type of radiation _____
A. Alpha radiation B. Beta radiation C. Gamma radiation D. None of the above

13). The energy which is stored as latent heat is called as _____ energy
A. Mechanical energy B. Electrical energy C. Thermal energy D. None of the above

14). The solar energy directly used for _____
A. Drying B. Water heating C. Distillation D. All of the above

15). The nuclear radiation unit is _____
A. Pascal B. Rankine C. Reaumur D. Roentgen

16). The standard form of HHW is _____
A. High level waste B. Low level waste C. High and low level waste D. None of the above

17). _____ radiation is called as a diffuse radiation
A. Scattered solar radiation B. Beam radiation C. Infrared radiation D. None of the above

18). Which type of radiation reaches the surface without absorption or without scattering?
A. Scattered solar radiation B. Infrared radiation C. Beam radiation D. None of the above

19). From the sun the solar energy is radiated in the form of _____ waves
A. Electromagnetic waves B. Infrared waves C. Transverse waves D. None of the above

20). The less insolation occurs when the sun is _____
A. At night B. Low in the sky C. High in the sky D. None of the above

21). In solar cells _____ material is used
A. Copper B. Silver C. Silicon D. None of the above

22). The range of solar cell efficiency is
A. 5-10% B. 10-15% C. 15-20% D. None of the above

23). In aircrafts _____ batteries are used
A. Alkaline battery B. Aluminium-ion battery C. Nickel-iron battery D. None of the above

24). _____ comes under the indirect method of solar energy utilization
A. Water power, wind, wave energy B. Marine currents, OTEC C. Biomass D. All of the above

25). The efficiency achieved from solar thermal energy is almost _____
A.20-45% B.10-40% C.15-30% D. None of the above

26). The medium temperature in the concentrating solar technologies divided into how many parts?
A. One B. Two C. Three D. Four

27). The thin bottom layer of the semiconductor in the solar cell is also called as _____
A.P - type   B.N - type   C.PNP - type   D. All of the above

28). The concentrating solar technologies divided into how many parts?
A. One   B. Two   C. Three   D. Four

29). The low temperature in the concentrating solar technologies divided into how many parts?
A. One   B. Two   C. Three   D. Four

30). The efficiency achieved from photovoltaic is almost _____
A.20-45%   B.20-40%   C.19-24%   D. None of the above

Short Questions

31.	Outline the various steps in mathematical model development for solar system.	[5]
32.	Discuss the type, stages and selection of computational modelling for solar system	[5]
33.	Outline the various energy storage systems	[5]
34.	Discuss various type of mechanical, electrical, chemical, thermal, electromagnetic and biological energy storage system	[5]