

B.Sc. Semester-4 Honours Examination -2020

Sub. : PHSA

PAPER- SEC B

FM-50

Renewable Energy and Energy Harvesting

Modalities

1. An examinee shall not attend her/his college in person to sit for the examination of a practical paper. Examinee shall
 - (a) write her/his answer with BLACK INK only.
 - (b) must attach a scanned copies of her/his admit card of previous examination and the registration certificate at the end of the answer script.
 - (c) scan the whole answer script in a single .pdf file. If it is instructed to use separate answer scripts for different modules/units, if any, examinee must do accordingly, but she/he shall create a single .pdf file for the answer script. There will be exactly one .pdf file for each examinee.
 - (d) upload her/his answer script through proper web portal to submit.
2. The full marks and duration of examination of a paper shall be in accord with those specified by the University of Calcutta. The examination of a paper shall consist of three parts, viz., Internal Examination, Theory and Practical. **An examinee must use separate answer scripts for the three parts but scan the whole answer script(answers, admit card and registration certificate) in a single .pdf file and upload.**
3. For examinations of a practical paper, examinees need not submit their laboratory work book, neither they have to face any viva. Examinees shall have to answer the questions following the instructions given in the question paper. Examinees shall use her/his own graph-papers to draw graphs(if any) in practical papers and attach them at proper positions of the answer script. Examinees shall draw circuits and graphs with BLACK INK only.

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Use separate answer scripts for Internal and Theory examinations.

INTERNAL ASSESSMENT -10 marks

1. Answer **any five** questions $2 \times 5 = 10$
- (a) What are the renewable sources of energy?
 - (b) What are fossil fuel?
 - (c) What is meant by geothermal energy?
 - (d) What is solar photovoltaic (PV)?
 - (e) What is piezoelectric effect?
 - (f) What are the three key factors those affect the amount of energy that a wind turbine can harness?
 - (g) Mention a few carbon- captured technologies.
 - (h) What is Osmotic Power?

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THEORY-40

(Answer *any four* questions)

2.(a)What is meant by conventional and non-conventional sources of energy?

(b)Make a comparative study between conventional and non-conventional sources of energy.

[5 +5=10]

3.(a) What is meant by nuclear energy? Describe briefly the processes by which nuclear energy is harnessed.

(b) Discuss the advantages and disadvantages of nuclear power generation.

[5 + 5 = 10]

4. (a) What is wind power? Show theoretically that the maximum power delivered to the rotor system in a wind mill is

$$P_{max} = \frac{2}{27} \pi \rho D^2 v^3$$

(b) Discuss the advantages and challenges of wind power.

[5 + 5 = 10]

5.(a) Discuss briefly the processes involved in the biomass conversion.

(b) Write a short note on Environmental issues and Renewable sources of energy.

[5 + 5 = 10]

6. (a) What are the advantages and disadvantages of tidal energy.

(b) Show that for two-way operation of tidal wave the maximum obtainable energy is $\rho g A H^2$; where the symbols are usual.

[5 + 5 = 10]