SH-III/Physics/305/SEC-1/19

B.Sc. 3rd Semester (Honours) Examination, 2019-20

PHYSICS

Course ID : 32415 **Course Code : SH/PHS/305/SEC-1**

Course Title : Renewable Energy and Energy Harvesting

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any five* questions: 2×5=10

(a) Name the four types of geothermal resources.

(b) What is tilt factor?

(c) What do you mean by anaerobic digestion?

(d) Name four thermal power plants in our State.

(e) Give some application of solar cells.

(f) Give two examples of fossil fuels.

(g) What is solar pond?

(h) What is piezoelectric effect?

2. Answer *any four* questions: 5×4=20

(a) What are the factors that may influence the efficiency of solar energy operated devices. Name some solar energy operated devices. 3+2=5

(b) What is meant by electromechanical coupling factor? What are the series and parallel resonance frequencies of a piezoelectric plate soldered at two faces?

(c) Discuss how the tidal energy can be utilized as renewable energy source. 5

(d) What do you mean by the non-conventional energy sources? Give examples of some non-conventional energy sources. 3+2=5

(e) Explain with a circuit diagram how an array of solar cells can be used as a battery charger. 5

(f) Mention the essential components of hydroelectric power plant. Draw a flow chart for such a plant.

3. Answer *any one* question: 10×1=10

(a) What is the basic principle of ocean thermal energy conversion? Discuss various methods of fidal power generation in brief. What are the limitations of each method? 2+6+2=10

(b) What is biomass energy? Why biomass based energy options should receive priority over other options? What is the potential in India for biomass-based system? 2+4+4=10

B.Sc. 3rd Semester (Honours) Examination, 2019-20

PHYSICS

Course ID : 32415 **Course Code : SH/PHS/305/SEC-1**

Course Title : Computational Physics

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Attempt *any five* questions: 2×5=10

(a) Describe the FORTRAN statement IMPLICIT NONE.

(b) Draw the flowchart symbols for input, decision, process and connector.

(c) Write at least 2 standard data types in fortan.

(d) Why is it necessary to declare return type of a user defined function in fortran?

(e) Write Latex statement to generate table of contents in Latex document.

(f) Give Latex to write any two Greek letters within a text line.

(g) Write gnuplot statements to put labels on the X and Y axis.

(h) Explain how gnuplot input file used for plotting.

2. Attempt *any four* questions: 5×4=20

(a) Draw a flow chart to read all elements of an array of real numbers of size.

(b) Write a program in fortran to read all elements of an array of real numbers of dimension 5×5 and find the average of all these elements.

(c) Explain the syntax of "go to" statement in fortran and describe its merit and drawbacks.

(d) Write the syntax of two Nested Block II statement in Fortran. Give example.

(e) Describe the advantages and disadvantages of Latex.

(f) Describe how to include graphics image files in Latex document.

3. Attempt *any one* questions: 10×1=10

(a) Describe any five features of Gnuplot. Describe the use of multiplot statement in Gnuplot with examples. 5+5=10

(b) Explain how gnuplot input file is created? Write the gnuplot statements involved in plotting $f(x) = \sin(5x) / \sin(x)$ in the range $-2 < x < 2$ and saving the plot as ".eps" file. 5+5=10

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