SH-III/Physics-305SEC-1(T)/19

B.Sc. Semester III (Honours) Examination, 2018-19

PHYSICS

Course ID : 32415 **Course Code : SHPHS-305SEC-1(T)**

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. Answer *any five* of the following:

(a) What is keyword? Give example. 2

(b) What is variable? Give example. 2

(c) What is gnuplot? 2

(d) What is array? How we can draw an one dimensial array in Fortran? 2

(e) How do we add a single line comment in Fortran? 2

(f) What are internal command in linux? Give example. 2

(g) What is the fortran syntex to open a file? 2

(h) Write a Fortran equivalent for the expression $Z = \frac{x^2+y^2}{2}$. 2

2. Answer *any four* of the following:

(a) What is algorithm? Write an algorithm to find the largest among three numbers. 1+4=5

(b) What is flowchart? Draw a flowchart that will find the root of a quadratic equation. 1+4=5

(c) What do you mean by control statement? Explain if-then-else statement with an example. 2+3=5

(d) State the function of while-do statement with suitable example.

(e) How to plot a vertical line in gnuplot? How to produce graph of an exact border size? 2+3=5

(f) What is Latex? How do we add an image in Latex? Write a latex equivalent code for the expression $Z = \frac{(x^2+y^2)}{2} + \sin(n)$. 1+2+2=5

3. Answer *any one* of the following:

(a) Explain different data types in Fortran. Write a Fortran program to find the factorial of a given number. 4+6=10

(b) Explain different operators in Fortran. Write a Fortran program to print Fibonacci series up to *n* terms. 4+6=10

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B.Sc. Semester III (Honours) Examination, 2018-19

PHYSICS

Course ID : 32415 **Course Code : SHPHS-305-SEC-1(T)**

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 two green house gases.

(b) What are the main characteristics of a material to exhibit piezoelectric effect?

(c) What is selexol?

(d) Why is renewable energy important?

(e) What is Photovoltaic effect?

(f) What are the different ways to use solar energy?

(g) Mention the factors on which the generation of hydroelectricity depends.

(h) What is tidal energy?

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

(a) Explain the terms non-renewable and renewable energy sources with suitable examples. 5

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

(c) Explain the operation of a photovoltaic cell. How is the photovoltaic energy generated? 3+2=5

(d) What do you mean by geo-thermal energy? Briefly describe the working principle of a Geo-thermal plant. 1+4=5

(e) What are the technologies that can be used to capture CO_2? Briefly explain the process of Post-combustion CO_2 capture technique. 2+3=5

(f) Discuss how the wind energy can be utilized as renewable energy source. 5

3. Answer *any one* question: 10×1=10

(a) What is a solar cell? Briefly explain the operating principle of a solar cell. Sketch and discuss typical characteristics curves of a solar cell. What are the factors on which the open-circuit voltage across a solar cell depend? 1+4+3+2=10

(b) What is the source of energy of Sun? Explain the origin of nuclear energy. Write the merits and demerits of using nuclear energy/nuclear Power plant. 2+3+5=10

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