21U113 (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS - UG)

CC19U PHY1 B01 - METHODOLOGY OF SCIENCE AND BASIC MECHANICS

(Physics - Core Course)

(2019 Admission - Supplementary/Improvement)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 2 marks.

1. What is pseudoscience? Explain with an example.
2. What is the importance of peer review in science?
3. What are inertial frames of reference?
4. Write the reason for weightlessness of freely falling bodies.
5. What is the meaning by 'fictitious force' ?
6. Explain the work- energy theorem in one dimension.
7. What are energy diagrams?
8. Expand the angular momentum in terms of cross product.
9. Explain the significance of moment of inertia?
10. What is a rigid body?
11. What is Poisson's ratio? Give its limiting values.
12. What is neutral surface for a loaded cantilever? Sketch a neat diagram showing the neutral surface.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer ***all*** questions. Each question carries 5 marks.

13. What is a scientific theory? What are the criteria that a theory is expected to meet?
14. A man sitting in a train throws a ball upward. Where will the ball fall relative to the man when 1) Train moves uniformly 2)Train is accelerated forward 3)Train moves along a circular track

15. What is the force on mass 'm' , when it is tied to a string and whirls with constant speed v, in a horizontal plane.

16. Find the work done by a force $F = f_o + Kx$ acting parallel to x-axis on an object which moves along x-axis from x_1 to x_2

17. Suppose that a mass is projected upward with initial velocity $\mathbf{u} = u_x\hat{i} + u_y\hat{j} + u_z\hat{k}$. Find the speed at height h.

18. Illustrate the law of conservation of angular momentum by suitable examples.

19. Find the work done twisting a cylinder.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. Show that for N compartment freight train the acceleration is equal to F/NM, where F is the external force and M is the mass of compartment.

21. What is a conical pendulum? Obtain the expressions for angular momentum and torque of the conical pendulum about origin and pivot.

(1 × 10 = 10 Marks)

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