Reg No:..... K24FY 1485 (B)
Name :.....

First Semester FYUGP Physics Examination NOVEMBER 2024 (2024 Admission onwards) KU1DSCPHY116 (INTRODUCTION TO COMPUTATIONAL PHYSICS)

(DATE OF EXAM: 4-12-2024)

Time : 90 min Maximum Marks : 50

Part A (Answer any 6 questions. Each carries 2 marks)

1. Define mechanics in Physics. How do Physicists use calculus and numerical methods to study motion of objects? 2

2. What are standardized units in physics? 2

3. What are numerical errors? 2

4. What are bits and bytes? 2

5. How does the position vs. time plot illustrate the motion of a freely falling ball? 2

6. Differentiate between average velocity and instantaneous velocity. 2

7. What is the mathematical condition that indicates when a falling object hits the ground. 2

8. How can you use Python to calculate the net force on an object? 2

Part B (Answer any 4 questions. Each carries 6 marks)

9. a) Write a script that calculates the volume of a cylinder given its radius r and height h according to the formula $V = \pi r^2 h$. b) Use the script to find the volume of a cylinder with radius r = 2 cm and heights h = 5cm, h = 10cm, h = 15cm . 6

10. The speedometer in your car reports the speed to be 60 kilometres per hour .How can you convert this to metre per second. 6

11. Describe briefly about uncertainty and significant digits . 6

12. How does the motion of a ball change if the mass of the ball is increased. 6

13. How does the acceleration of an object change as it falls through the air? 6

14. A 10 kg object is subjected to a gravitational force. Use Python to calculate its weight on Earth, where g=9.8 m/s2 Analyze how the weight changes with different gravitational forces on the Moon. 6

Part C (Answer any 1 question(s). Each carries 14 marks)

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15. Create a modular Python program that performs various mathematical operations, including addition, subtraction, multiplication and division. 14

16. A person of mass m is standing in an elevator of mass M. The person is standing on spring-weight with negligible mass and spring constant k. Find the force shown by the weight and the force in the wire if both the elevator and the person is moving with a constant acceleration a. Discuss what really happens as the elevator starts moving from rest. 14

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