

BACHELOR'S DEGREE EXAMINATION, OCTOBER 2025
2025 ADMISSIONS REGULAR
SEMESTER I - MINOR - B (PHYSICS)
PH1DSCB101B24 - FOUNDATIONS OF PHYSICS

Time : 1.5 Hours

Maximum Marks : 50

Part A

Answer all questions. Each question carries 1 mark.

(1x10=10)

1. Python is a high level language. True or false? [CO1,Understand]
2. List any one escape sequence character in Python language. [CO1,Understand]
3. Explain the term trajectory. [CO1,Remember]
4. For an object to be in equilibrium, the net external force acting on it should be [CO2,Understand]
5. A stretched rubber band on release propels a stone forward. What energy conversion takes place? [CO2,Understand]
6. The weight of an object varies from one location to another. True or false? [CO2,Understand]
7. 1 Joule is
 - (i) 1 Nm
 - (ii) 1 N/m
 - (iii) 1 Nm²
 - (iv) 1 N/m² [CO3,Understand]
8. Unit of kinetic energy is [CO3,Understand]
9. 1 hp = watts [CO3,Understand]
10. Write the escape sequence character for inserting a new line in python programme. [CO4,Understand]

Part B

Answer any 2 questions from the bunch of CO1. Each question carries 5 mark.

(5x2=10)

11. You throw a rock straight up from the edge of a cliff. It leaves your hand at time $t = 0$ moving at 12.0 m/s. Air resistance can be neglected. (a) Find both times at which the rock is 4.00 m above where it left your hand. (b) Find the time when the rock is 4.00 m below where it left your hand. [CO1,Apply]
12. Set up the equation for the path along x axis and y axis of a projectile. Two seconds after projection a projectile is travelling in a direction inclined at 30° to the horizontal after one more sec, it is travelling horizontally, what are the magnitude and direction of its velocity ? [CO1,Apply]
13. A cyclist going around a circular track at 10.0 m/s has a centripetal acceleration of 5.00 m/s². What is the radius of the curve? [CO1,Apply]

Part B

Answer any 2 questions from the bunch of CO2. Each question carries 5 mark.

(5x2=10)

14. A 900-kg motorcycle accelerates uniformly from 5 m/s to 25 m/s in 6 seconds. Find the average net force on it. [CO2,Apply]
15. In which of the following situations is there zero net external force on the object? Why?
 - (i) An airplane flying due north at a steady 100 m/s and at a constant altitude
 - (ii) A car driving straight up a hill with a 4° slope at a constant 90 km/h
 - (iii) A hawk circling at a constant 10 km/h at a constant height of 10 m above an open field

(iv) A box with slick, frictionless surfaces in the back of a truck as the truck accelerates forward on a level road at 3 m/s^2 . [CO2,Apply]

16. Rank the following situations in order of the magnitude of the object's acceleration, from lowest to highest. Are there any cases that have the same magnitude of acceleration?
- (i) A 2.0 kg object acted on by a 2.0 N net force;
 - (ii) A 2.0 kg object acted on by an 8.0 N net force
 - (iii) An 8.0 kg object acted on by a 2.0 N net force
 - (iv) An 8.0 kg object acted on by a 8.0 N net force
- [CO2,Apply]

Part B

Answer any 2 questions from the bunch of CO3. Each question carries 5 mark. (5x2=10)

17. A body of mass 1 kg is moving with velocity 4 m/s. A force of 2 N is applied on it in the direction of motion for 5 m.
- (i) Calculate the work done by the force.
 - (ii) Find the increase in kinetic energy.
 - (iii) Verify the Work–Energy Theorem.
- [CO3,Apply]
18. A 50 kg marathon runner runs up the stairs to the top of Chicago's Willis Tower which is 443 m tall. To lift herself to the top in 15 minutes, what must be her average power output? [CO3,Apply]
19. Differentiate between static, kinetic and rolling frictional forces and deduce the coefficients of friction in each case. [CO3,Understand]

Part C

Answer any 1 question from the bunch of CO4. Each question carries 10 mark. (10x1=10)

20. (i) Write a python programme to print a table of 3 using *while* loop.
(ii) Write a python programme to calculate the remainder of two numbers 10 and 4. [CO4,Apply]
21. (i) Write a note on the characteristics of python language.
(ii) Write a python programme to calculate the square of a number entered by the user. [CO4,Apply]