

INTERNATIONAL INDIAN SCHOOL BURAIDAH

CLASS XI / TERM EXAMINATION (2019-2020) / SUBJECT: PHYSICS

Date: 18 Jun 2019 /Duration: 3 Hour / Max. Marks: 70

General Instructions: -

SET B

- I. Write 'SET B' in the answer sheet
- II. All questions are compulsory
- III. There is no overall choice. However an internal choice has been provided in one question of 2 marks, one question of 3 marks and all three question of 5 marks.
- IV. Question numbers 1 to 20 are very short answer type question carrying 1 mark each.
- V. Question numbers 21 to 27 are short answer type question carrying 2 marks each.
- VI. Question numbers 28 to 34 are short answer type question carrying 3 marks each.
- VII. Question numbers 35 to 37 are long answer type question carrying 5 marks each.
- VIII. Use of calculator is not permitted. However you may use log table, if necessary.

Question no. 1 to 20 are very short answer type question carrying 1 mark each.

1. Name the fundamental force which is responsible for the stability of the nucleus.
2. Derive S.I. unit of Joule (J) in terms of fundamental units.
3. Write SI unit and Dimensional formula of power.
4. State the no. of significant figures in the following
a) 3.56×10^{-34} b) 0.00005302
5. A pebble of mass 0.05kg is thrown vertically upwards. Given the direction and magnitude of the net force on the pebble,
 - (a) During its upward motion
 - (b) During its downward motion
6. A body is initially at rest. It undergoes one-dimensional motion with constant acceleration. Show that the power delivered to it at time 's' is proportional to 't'.
7. What is the moment of inertia of a rod of mass M, length l about an axis perpendicular to it through one end?
8. Draw the position-time graph of an object moving with negative velocity.
9. If $x = a + bt + ct^2$, where x is in meter and t in second, what is the unit of c
10. The mass of an object on moon is 10 kg, what is its mass on earth?
11. State parallel axis theorem
12. State perpendicular axis theorem
13. State triangular law of vector addition
14. Round off the given value corresponding to three significant figure
 - a. 6.526
 - b. 1.755

15. Draw

a. Velocity- time graph for uniform motion.

16. Write law of static friction.

17. What is instantaneous velocity?

18. What is a geostationary satellite?

19. Write advantage of friction.

20. What is the relation between 'acceleration due to gravity g ' and universal gravitational constant ' G '.

Question No 21 to 27 carry two mark each

21. State universal law of gravitation (2)

22. Derive work energy theorem. (2)

23. The displacement and time graph of two bodies P and Q makes angle of 45 and 30 with time axis. What is the ratio of their velocities? (2)

24. Check correctness of the equation by dimensional analysis methods
 $F_c = mv^2 / r$ (2)

25. Find the angle between the vector $A=3i+4j-5k$ and Vector $B =5i+4j+3k$ (2)

OR

Find the Torque if $r=i+4j-5k$ in meter and Force $F =2i+3j+3k$ (2)

26. Prove law of conservation of linear momentum (2)

27. A body of mass 5 kg is acted upon by two perpendicular forces of magnitude 8 N and 6 N. Find the magnitude and direction of the acceleration. (2)

Question No 28 to 34 carry Three mark each

28. Derive a relation for time period of a simple pendulum by method of Dimension. (3)

29. The measurement of a length are 5.23, 5.22, 5.15, 5.34 in cm calculate absolute error, relative error and percentage error. (3)

30. A physical quantity Q is given by

$$Q = A^2 B^{3/2} / C^4 D$$

The percentage error in A, B, C and D are 2%, 3%, 4%, 2% respectively. Find the percentage error in Q? (3)

31. Car A moving with speed 30m/s and another car B after 10 second start moving with speed 40 m/s in the same direction of car A. At what time can A and B meets.

32. A ball thrown with a speed of 60m/s and angle θ with respect to horizontal. (3)

a. Calculate time of maximum height

b. Maximum height

33. In a ballistic demonstration a police officer fires a bullet of mass 50g with speed 200m/s on soft plywood of thickness 2cm. the bullet emerges with only 10% of its initial kinetic energy. What is the emergent speed of the bullet? (3)

Derive an expression for potential energy of a spring. (3)

or

Express work energy theorem for variable force

Question No 35 to 37 carry Five mark each

35. Derive equation of motion using calculus method. (5)

OR

a. What is banking of road

b. Derive an expression for velocity of a car moving on a circular banked road.

36. A particle starts from origin at $t=0$ with a velocity of 10 m/s and moves in the x-y plane with a constant acceleration of $8\mathbf{i}+2\mathbf{j} \text{ m/s}^2$.

i. At what time is the x-coordinate of the particle 16m ? What is the 'y' coordinate of the particle at that time?

ii. What is the speed of the particle at that time?

b. Prove that $\mathbf{A}=\mathbf{i}+2\mathbf{j}+3\mathbf{k}$ and $\mathbf{B}=2\mathbf{i}-\mathbf{j}$ are perpendicular to each other. (5)

OR

An object that is in flight after being thrown or projected is called a projectile.

a. Which component of the velocity of a projectile remain constant throughout the motion?

b. Derive the equations for time of flight and maximum height attained by a projectile.

c. Show that the ranges are same for two angles of projection for a projectile with same velocity of projectile

37. Derive an expression for variation of 'g' with altitude (5)

OR

Derive an expression for variation of 'g' with depth