

NATIONAL SCHOLARSHIP TEST 2025-26

PGDM

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BS COMPUTER SCIENCE
AI - ML - DATA SCIENCE
FOUR YEAR MULTIDISCIPLINARY COURSE

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Helpline Numbers: 9849 464 333, 9849 247 333, 9948 341 333

PHYSICS, Paper – I (English Version)

Time : 3 Hours

Max. Marks : 60

Note : This question paper consists of three sections A, B and C.

SECTION – A

Note : i) Answer all questions

$10 \times 2 = 20$

ii) Each question carries two marks

iii) All are very short answer type questions

1. If $P = 2\hat{i} + 4\hat{j} + 14\hat{k}$ and $Q = 4\hat{i} + 4\hat{j} + 10\hat{k}$ find the magnitude of $P + Q$.
2. Can two vectors of unequal magnitude add up to give the zero vector?
Can three unequal vectors add up to give the zero vector?
3. Why does the car with a flattened tyre stop sooner than the one with inflated tyres?
4. Calculate the time needed for a net force of 5 N to change the velocity of a 10 kg mass by 2 m/s.
5. What is the pressure on a swimmer 10m below the surface of a lake?
6. Define coefficient of viscosity. What are its units and dimensions?
7. What is greenhouse effect? Explain global warming.
8. What is latent heat of vapourization ?
9. What is the expression between pressure and kinetic energy of a gas molecules?
10. Four molecules of a gas have speeds 1,2,3 and 4 km/s. Find the rms speed of the gas molecule.

SECTION – B

II. Note : i) Answer any SIX of the following questions.

$6 \times 4 = 24$

ii) Each question carries four marks.

iii) All are short answer type questions.

11. A motorist drives north for 30 min at 85 km/h and then stops for 15 min. He continues travelling north and covers 130 km in 2 hours.

What is his total displacement and average velocity?

12. State parallelogram law of vectors. Derive an expression for the magnitude and direction of the resultant vector.
13. Define the terms momentum and impulse. State and explain the law of conservation of linear momentum. Give examples.
14. Explain advantage and disadvantages of friction.
15. The moment of inertia of a fly wheel making 300 revolutions per minute is 0.3 kgm^2 . Find the torque required to bring it to rest in 20 s.
16. Define angular velocity (ω). Derive $V = r\omega$.
17. Derive an expression for the variation of acceleration due to gravity below the surface of the earth.
18. Explain conduction, convection and radiation with examples.

SECTION-C

III. Note: i) Answer any **TWO** of the following questions.

$2 \times 8 = 16$

ii) Each question carries **EIGHT** marks.

iii) All are **long answer** type questions.

19. a. Develop the notions of work and kinetic energy and show that it leads to work-energy theorem.
b. An elevator can carry a maximum load of 1800 kg (elevator + passengers) is moving up with a constant speed of 2 ms^{-1} . The frictional force opposing the motion is 4000 N. Determine the minimum power delivered by the motor to the elevator in watts as well as in horse power.
20. a. Explain reversible and irreversible processes. Describe the working of Carnot engine. Obtain an expression for the efficiency.
b. A refrigerator is to maintain eatables kept inside at 9°C . If room temperature is 36°C , calculate the coefficient of performance.
21. a. State second law of thermodynamics. How is heat engine different from a refrigerator?
b. Can a room be cooled by leaving the door of an electric refrigerator open?

MARCH – 2025
Board of Intermediate Education
Physics 1st Year
SET-1

Time : 3 Hrs

Total Marks : 60 M

SECTION – A

I Answer all the following questions 10x2=20M

- 1) What is the contribution of S. Chandrasekhar to physics?
- 2) Distinguish between accuracy and precision.
- 3) If $\vec{P} = 2\hat{i} + 4\hat{j} + 14\hat{k}$ and $\vec{Q} = 4\hat{i} + 4\hat{j} + 10\hat{k}$ find the magnitude of $\vec{P} + \vec{Q}$.
- 4) If a bomb at rest explodes into two pieces, the pieces must travel in opposite directions. Explain.
- 5) Why water droplets wet the glass surface and does not wet lotus leaf?
- 6) Mention any two applications of Bernoulli's theorem.
- 7) Distinguish between heat and temperature?
- 8) The roof of buildings are often painted white during summer. Why?
- 9) Define mean free path.
- 10) State Boyle's law and Charles' law.

SECTION – B

II Answer any six of the following questions 6x4=24M

- 11) When a ball is thrown vertically upwards with a velocity of 20 ms^{-1} from the top of a multistory building, the height of the point from where the ball is thrown is 25.0m from the ground.
 - a) How high will the ball rise? And
 - b) How long will it be before the ball hits the ground?
- 12) Show that the trajectory of an object thrown at certain angle with the horizontal is a parabola.
- 13) Explain the advantages and disadvantages of friction.
- 14) Distinguish between the centre of mass and the centre of gravity.
- 15) Define vector product. Give an example. Write two properties of vector product.

- 16) What is a geostationary satellite? State its uses?
- 17) Explain the behavior of a wire under gradually increasing load.
- 18) Explain conduction, convection and radiation with examples.

III Answer any two of the following questions 2 x 8 = 16M

- 19) a) Develop the notions of work and kinetic energy and show that it leads to work- energy theorem.
b) State conditions under which a force does no work.
- 20) A) Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period,
b) what is seconds pendulum? What is the length of a simple pendulum which ticks seconds?
($g=9.8\text{ms}^{-2}$)
- 21) Explain reversible and irreversible processes. Describe the working of cornot engine. Obtain an expression for the efficiency.

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