



INDIAN SCHOOL MUSCAT PRACTICE PAPER

CLASS : XI

SUBJECT: PHYSICS

Marks : 70

Time : 3H

General Instructions :

- (i) All questions are compulsory.
- (ii) There are 26 questions in total. Questions 1 to 5 are very short answer type questions and carry one mark each.
- (iii) Questions 6 to 10 carry two marks each, questions 11 to 22 carry three marks each and questions 24 to 26 carry five marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions of five marks each. You have to attempt only one of the choices in such questions.
- (v) Question 23 is a value based question carrying four marks.

Use of calculators is not permitted. However, you may use log tables if necessary.

SECTION A

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|---|--|---|
| 1 | Why the handle in a grinding stone is preferably near its perimeter or edge? | 1 |
| 2 | State Wien's law of heat radiation. | 1 |
| 3 | Why pillars or columns are made in the shape I ? | 1 |
| 4 | Plot a graph between energy and time for damped oscillations. | 1 |
| 5 | In winter season distant sounds are heard clearly than during summer why? | 1 |

SECTION B

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|---|---|---|
| 6 | a) Why automobile tires must be retreaded or replaced when they become old?
b) If action and reaction are equal and opposite how does a horse pull a cart? | 2 |
| 7 | A solid cylinder of mass 20kg of radius 25 cm rotates about its axis with angular speed 100 rad/s. What is the rotational kinetic energy of the cylinder? What is the magnitude | |

- of the angular momentum of the cylinder about its axis?
(OR) 2
- A rope of negligible mass is wound round a hollow cylinder of mass 3kg and radius 40cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30N? What is linear acceleration of the rope? Assume that there is no slipping .
- 8 a) Write first law of thermodynamics for an adiabatic process.
b) Mention two differences between reversible and irreversible process 1+1
- 9 State and verify Avagadro law. 2
- 10 i) At what height above the surface of earth the acceleration due to gravity is equal to the value at a depth of 50 m from surface of earth?
ii) Why does moon have no atmosphere? 2
- SECTION C
- 11 a) State two difference between accuracy and precision.
b) If the length and time period of an oscillating pendulum have errors of 1% and 2% respectively, what is the percentage error in acceleration due to gravity g determined by using the pendulum?
c) While performing titration , a student takes upper meniscus for the acid level in burette will it cause an error, if so what kind of error? 1+1+1
- 12 a) Define i) Horizontal range and ii) time of flight of a body projected with a velocity u at an angle θ with respect to the horizontal.
b) At maximum height the kinetic energy of an oblique projectile becomes half of its initial value ,determine the angle of projection 1+2
- 13 Define centripetal acceleration and derive an expression for the centripetal acceleration of a particle in uniform circular motion
(OR)
Derive the equation $v^2 = u^2 + 2aS$ by graphical method for a particle in uniform acceleration 3
- 14 Define centre of mass of a system. Derive expression for the centre of mass of a system of two particles. 1+2
- 15 a) Define impulse and derive the relation between impulse and linear momentum.
b) How will you calculate impulse from force time graph? 1+1+1
c) Why automobiles are provided with shock absorbers?

- 16 a) Mention one use of high specific heat capacity of water.
 b) In a thermos flask how heat loss by radiation is minimized?
 c) Why Pressure cookers are essential for cooking at hill stations? 1+1+1
- 17 a) What is an indicator diagram? Mention its use.
 b) Why efficiency of a heat engine cannot be 100% or unity?
 c) Calculate the Coefficient of performance of a refrigerator working between -3°C and 27°C 1+1+1
- 18 a) Define degrees of freedom
 b) For one mole of diatomic gas derive the expression for C_p and C_v and calculate the ratio C_p/C_v . 1+2
- 19 a) Why soldiers are asked not to march over old bridges ?
 b) Write the differential equation of Simple harmonic motion. 1+1+1
 c) Calculate the time period of a spring block system if its spring constant is 100N/m and the mass of the block is 25kg .
- 20 a) State any two differences between conservative and non conservative forces.
 b) show that relative velocity of one object with respect to another before collision is equal and opposite to relative velocity of second object with respect to first after the head on elastic collision. 1+2
- 21 State and prove work energy theorem.
 How does the Potential energy of a body change , if work done by conservative force is negative ? 3
- 22 State and verify Kepler's third law or the law of Periods. 3
- SECTION D**
- 23 a) Anand is a class eleven student of Science group. He always insists that the driver of his school bus or his father should not use mobile phones while driving. He rightly points that, in addition to usage of mobile during driving, drunken driving also will slow the reflexes of the driver and increases his reaction time.
 Mention any two values displayed by Anand. 2+2
 b) On seeing someone lying on the road at a distance of 50m ahead, the driver

of a car applies brakes. If his initial uniform speed is 72km/h and his reaction time is 0.25s ,will the car stop before the person lying down on the road or not? Take the negative acceleration to be 5m/s^2

SECTION E

- 24 a) State and prove the law of conservation of linear momentum.
- b) A bullet of mass 0.04 kg moving with a speed of 90 m s^{-1} enters a heavy wooden block and is stopped after a distance of 60 cm. What is the average resistive force exerted by the block on the bullet?.
- (OR) 3+2
- a) Derive expression for Optimum and maximum permissible speed of a car on a banked circular track.
- b) A cyclist speeding at 18 km/h on a level road takes a sharp circular turn of radius 30 m without reducing the speed. The co-efficient of static friction between the tyres and the road is 0.1. Will the cyclist slip while taking the turn ? Justify .(take $g = 10\text{m/s}^2$)
- 25 a) Derive expression for the excess of Pressure **P** inside a liquid drop of radius **r** and surface tension **σ** .
- b) Why liquid drops of small size are spherical in shape ?
- c) Why does water wet glass and mercury does not stick to the glass?
- (OR) 3+1+1
- a) State and prove Bernoulli's theorem.
- b) Why is it dangerous for a person to stand closer to a railway track on the platform of a station when a fast moving train approaches?
- c) State two differences between stream lined flow and turbulent flow.
- 26 a) Show that the oscillations of a simple pendulum are Simple Harmonic and derive expression for frequency of oscillations of simple pendulum
- b) The equation of a particle in SHM is given below, where y is metre and t is in second .Calculate its i) time period ii) amplitude iii) velocity amplitude iv) initial phase. $y = 0.05 \sin(50\pi t + \pi/3)$
- (OR) 3+2
- a) Discuss about the harmonics formed in an Open Organ Pipe and Show that the harmonics are in the ratio 1:2:3 ...
- b) A train standing at a signal of a railway station blows a whistle of frequency 256 Hz in air. Calculate the frequency of the sound as heard by a person standing on the platform when the train (i) approaches the platform with a speed of 40 m s^{-1} (ii) recedes from the platform with the same speed($V = 340\text{m/s}$)