

# SUCCESS KEY TEST SERIES

First Term Examination

Std: 11th Science

Subject: Physics

Time: 3Hrs

Date :

Chapter 1 To 7

Max Marks: 70

## Section A ( MCQ & VSA 1 MARKS Questions)

**Q.1 Select and write the correct answer:**

**10**

- (i) Trajectory of any motion is decided by  
(a) acceleration (b) initial velocity  
(c) both a and b (d) None of these
- (ii) Water falls from a height of 200 m. What is the difference in temperature between the water at the top and bottom of water fall given that specific heat of water is  $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ?  
(a)  $0.96^{\circ}\text{C}$  (b)  $1.02^{\circ}\text{C}$  (c)  $0.46^{\circ}\text{C}$  (d)  $1.16^{\circ}\text{C}$
- (iii) The \_\_\_\_\_ on the right hand side of the last non zero number are significant; but for this, the number must be written with a decimal point.  
(a) Non-zeros. (b) One. (c) Whole numbers. (d) Zeros.
- (iv) Which of the following is correct for strain?  
(a) The SI unit of strain is  $\text{Nm}^{-1}$ .  
(b) The SI unit of strain is  $\text{Jm}^{-2}$ .  
(c) The SI unit of strain is J.  
(d) Strain is a dimensionless quantity.
- (v) The temperature difference between two sides of an iron plate, 5 cm thick, is  $20^{\circ}\text{C}$ . Heat transmitted through the plate at the rate of 500 kcal per minute per square metre at steady state. Find the thermal conductivity of iron.  
(a)  $0.021 \text{ kcal/m s }^{\circ}\text{C}$  (b)  $0.012 \text{ kcal/m s }^{\circ}\text{C}$   
(c)  $0.123 \text{ kcal/m s }^{\circ}\text{C}$  (d)  $0.321 \text{ kcal/m s }^{\circ}\text{C}$
- (vi) Which of the following is a category of motion?  
(a) Rectilinear motion  
(b) Motion in a plane  
(c) Motion in space  
(d) All of these
- (vii) The correct expression for centripetal force is  
(a)  $F = mr\omega$  (b)  $F = mr\omega^2$  (c)  $F = mr\omega^3$  (d)  $F = mr\omega^4$
- (viii) The star, closest to earth after sun is at a distance of \_\_\_\_\_light years.  
(a) 4.26. (b) 4.27. (c) 4.28. (d) 4.29.
- (ix) Symbolically, vectors are represented by a \_\_\_\_\_ with an arrow below it.  
(a) Single small letter. (b) Single capital letter.  
(c) Double small letter. (d) Double capital letter..
- (x) The error in the measurement of the sides of a rectangle is 1%. The error in the measurement of its area is  
(a) 1% (b)  $\frac{1}{2}\%$  (c) 2% (d) None of the above.

**Q.2 Answer the following:**

**8**

- (i) An object moves from  $y = 12 \text{ m}$  to  $y = 15 \text{ m}$  in 5 s. What can be said about the magnitude of displacement and the path length?
- (ii) Which law defines inertia?
- (iii) Give an expression for the value of acceleration due to gravity at the equator?
- (iv) What is toughness?

- (v) What is zeroth law of thermodynamics?
- (vi) What is calculus?
- (vii) What is the elastic limit?
- (viii) Why thick walls are used in the construction of cold storage rooms?

### Section B (SA I - 2 MARKS EACH)

**Attempt any Eight:**

**16**

- Q.3** Write the factors on which time period of the conical pendulum depends.
- Q.4** Obtain derivatives of the following functions :  
 $x/\sin x$
- Q.5** Which units have you used in the laboratory for measuring and why?  
 (i) length (ii) mass (iii) time (iv) temperature
- Q.6** Define unit vector and give its physical significance.
- Q.7** What happens to the apparent weight of the person inside the lift moving with net upward acceleration?
- Q.8** In the following table, every item on the left side can match with any number of items on the right hand side. Select all those.

Types of collision	Illustrations
(a) Elastic collision	(i) A ball hit by a bat
(b) Inelastic collision	(ii) Molecular collisions responsible for pressure exerted by a gas
(c) Perfectly inelastic collision	(iii) A stationary marble A is hit by marble B and the marble B comes to rest.
(d) Head on collision	(iv) A blob of clay dropped on the ground sticks to the ground
	(v) Out of anger, giving a kick to a wall.
	(vi) A striker hits the boundary of a carrom board in a direction perpendicular to the boundary and rebounds.

- Q.9** A telephone wire 125 m long and 1 mm in radius is stretched to a length 125.25 m when a force of 800 N is applied. What is the value of Young's modulus for material of wire?
- Q.10** A gas at 900 °C is cooled unit both its pressure and volume are halved. Calculate its final temperature.
- Q.11** State the expression for acceleration of the centre of mass of the system of n particles and for continuous mass distribution.
- Q.12** A resistance thermometer has resistance 95.2  $\Omega$  at the ice point and 138.6  $\Omega$  at the steam point. What resistance would be obtained if the actual temperature is 27 °C?
- Q.13** What is rolling friction? How does it arise?
- Q.14** Define: (i) Sublimation (ii) Triple point

### Section C (SA II - 3 MARKS EACH)

**Attempt any Eight:**

**24**

- Q.15** A letter 'E' prepared from a uniform cardboard with shape and dimensions as shown in the figure. Locate its centre of mass.
- Q.16** Find a vector which is parallel to  $\vec{v} = \hat{i} - 2\hat{j}$  and has a magnitude 10.
- Q.17** The length, breadth and thickness of rectangular sheet of metal are 4.234 m, 1.005m, and 2.01 cm respectively. Give the area and volume of the sheet to correct significant figures.
- Q.18** Prove that vector addition is associative.
- Q.19** A metal sphere cools from 80 °C to 60 °C in 6 min. How much time with it take to cool from 60 °C to 40 °C if the room temperature is 30 °C?

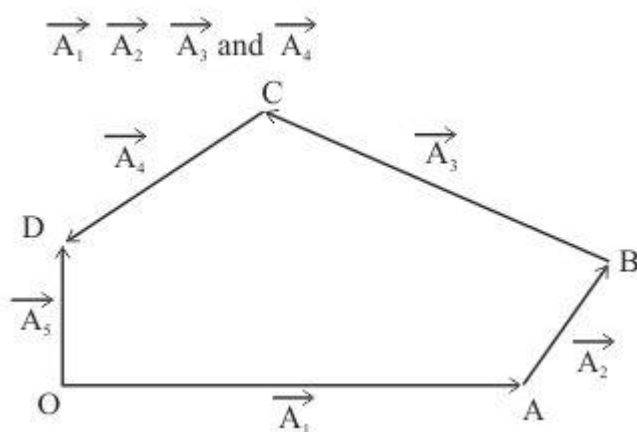
- Q.20** State the law conservation of linear momentum. It is a consequence of which law? Given an example from our daily life for conservation of momentum. Does it hold good during burst of a cracker?
- Q.21** What is bulk modulus? Derive an expression for bulk modulus.
- Q.22** The position vectors of three particles are given by  
 $\vec{x}_1 = (5\hat{i} + 5\hat{j})m$ ,  $\vec{x}_2 = (5t\hat{i} + 5t\hat{j})m$  and  $\vec{x}_3 = (5t\hat{i} + 10t^2\hat{j})m$  as a function of time  $t$ .  
 Determine the velocity and acceleration for each, in SI unit.
- Q.23** Evaluate the following integral :
- (i)  $\int_0^{\pi/2} \sin x \, dx$  (ii)  $\int_1^5 x \, dx$
- Q.24** Explain in detail what is specific heat capacity of a substance.
- Q.25** State the laws of static friction.
- Q.26** What is absolute zero?

#### Section D (SA II - 4 MARKS EACH)

**Attempt any Three:**

**12**

- Q.27** Derive an expression for centripetal acceleration of a particle performing uniform circular motion.
- Q.28** From the following figure, determine the resultant of four forces



- Q.29** (i) Define: (a) absolute error (b) mean absolute error
- (ii) Nuclear radius  $R$  has a dependence on the mass number ( $A$ ) as  $R = 1.3 \times 10^{-16} A^{1/3} \text{ m}$ . For a nucleus of mass number  $A = 125$ , obtain the order of magnitude of  $R$  expressed in meter.
- Q.30** (i) Define: (i) elasticity (ii) Strain
- (ii) A metal cube of side 1 m is subjected to a force. The force acts normally on the whole surface of cube and its volume changes by  $1.5 \times 10^{-5} \text{ m}^3$ . The bulk modulus of metal is  $6.6 \times 10^{10} \text{ N/m}^2$ . Calculate the change in pressure.
- Q.31** (i) Justify the statement, "Work and energy are the two sides of a coin".
- (ii) 40000 litre of oil of density 0.9 g/cc is pumped from an oil tanker ship into a storage tank at 10 m higher level than the ship in half an hour. What should be the power of the pump?

----- All the Best -----