

## SRI GURUDATTA COACHING CENTRE(SARMA INST.)

## MATHEMATICS

- 1) What is the sum of all prime factors of the number 555555.
- 2) Show that the sum of the two consecutive odd integers is always divisible by 4.
- 3) Find the value of 'x' if  $\frac{3x-1}{5} - \frac{1+x}{2} = 3 - \frac{x-1}{2}$
- 4) Match the following
 

<u>Name of the point</u>	<u>In a triangle point of concurrence of</u>
(i) Ortho centre	(A) Medians
(ii) Centroid	(B) Altitudes
(iii) Incentre	(C) Perpendicular bisectors of sides
(iv) Circum centre	(D) Bisectors of two external angles and bisector of third internal angle
(v) Ex-centre	(E) Bisectors of internal angles
- 5) If a, b, c are real and  $b \neq 0$ , can  $2b^2 - (b+c-a)(a+b-c)$  be negative, if so give an example.
- 6) If 'n' is an odd positive integer  $a^n + b^n$  is divisible by  $a+b$ . Find the remainder when  $20^{13} + 14^{13}$  is divided by 17.
- 7) ABC is an equilateral triangle, D and E are points on AB and AC. Such that  $DE \parallel BC$ , If  $AB = 10\text{cm}$ ,  $BD = 7\text{cm}$ , find the area of quadrilateral BCED.
- 8) If  $x + \frac{1}{x} = 2$ . Find the value of  $\left(x - \frac{1}{x}\right)^{14}$
- 9) ABCD is a parallelogram. AB is produced to E such that CE is perpendicular to AE and  $CE = 15\text{cm}$ ,  $AC = 25\text{cm}$ ,  $BE = 8\text{cm}$ . Find the perimeter of the parallelogram ABCD.
- 10) If  $a^2 + b^2 = 0$  then  $a=0$  and  $b = 0$ . If  $(3x-2y)^2 + (5y-7z)^2 = 0$ , find  $x : y : z$ .
- 11) In a trapezium parallel sides are 10cm and 8cm. Find the distance between them if its area is equal to the area of a rhombus whose diagonals are 12cm and 18cm long.
- 12) If  $x^2 + y = 10$  where 'x' is a prime number and 'y' is a perfect square, find  $x+y^2$ .
- 13)  $x^m + x^n = 10$ ,  $x^{m+n} = 16$ , then find the positive value of  $x^m - x^n$ .
- 14) The area of a circle passing through the vertices of a regular hexagon is 'x' units<sup>2</sup>. Find the area of the region not occupied by hexagon. Express in terms of 'x' and ' $\pi$ '. (Draw a neat sketch)
- 15) The units place of the integer formed by  $5^{20} + 3^{14}$  is \_\_\_\_\_.

## PHYSICS

### I Multiple choice questions

- (1) The stars are giant balls of ( )  
(A) Hydrogen (B) Helium (C) Oxygen (D) Nitrogen
- (2) The light from Sun reaches the earth in ( )  
(A) 8.3 sec. (B) 8.3 min. (C) 0.83 min. (D) 83 sec.
- (3) A train travels between two stations P and Q. It travels with a velocity 20KMPH from P to Q and returns to station P with a velocity 30KMPH. The average speed for the total journey ( )  
(A) 25 KMPH (B) 24 KMPH (C) 6.67 m/s (D) 0 m/s
- (4) A body moves with a variable velocity when ( )  
(A) magnitude of velocity changes (B) direction of motion of the body changes  
(C) any of A or B (D) none of these
- (5) The time in which a force of 2N produces a change in momentum of 0.4 Kg. m/sec in the body whose mass is 1Kg is ( )  
(A) 0.2 sec (B) 0.02 sec (C) 0.5 sec (D) 0.05 sec
- (6) A body is floating in water, its apparent weight is equal to ( )  
(A) actual weight of the body (B) unity  
(C) weight of the body - weight in liquid (D) none
- (7) By increasing the temperature of a liquid its ( )  
(A) volume and density decreases (B) volume increases and density decreases  
(C) volume and density increases (D) volume decreases and density increases
- (8) The maximum displacement of a vibrating particle from its mean position is called. ( )  
(A) frequency (B) amplitude (C) time period (D) none of these
- (9) The speed of light is maximum in ( )  
(A) glass (B) diamond (C) water (D) vacuum
- (10) The surest test for the electrification of a body is ( )  
(A) attraction (B) repulsion (C) both 'A' and 'B' (D) none of these

### II Match the following

#### Column - I

- (11) 36 KMPH  
(12) 9.8 m/s<sup>2</sup>  
(13) 1 Kilo Watt Hour  
(14) 0.02 km  
(15) 1 newton  
(16) 1 joule  
(17) Velocity  
(18) Force  
(19) 15 cm/sec  
(20) Momentum

#### Column - II

- A. 20000 mm  
B. Mass x acceleration  
C. 10<sup>7</sup> erg  
D. 36 x 10<sup>5</sup> joule  
E. 10 m/s  
F. 980 cm/sec<sup>2</sup>  
G. 10<sup>5</sup> dynes  
H. Frequency x Wave length  
I. Mass x velocity  
J. 0.54 KMPH

### III Fill in the blanks

- (21) If a body does not change its position with respect to its surroundings, the body is said to be at \_\_\_\_\_.
- (22) The equations of motion are applicable only when the body moves with \_\_\_\_\_ acceleration.

- (23) Newton's first law of motion gives the concept of \_\_\_\_\_.
- (24) A force of 100N acts on a body of mass 2Kg for 10sec the change in momentum of the body is\_\_\_\_\_.
- (25) \_\_\_\_\_ is an instrument used to measure the atmospheric pressure.
- (26) The S.I. unit of temperature is \_\_\_\_\_.
- (27) The waves with a frequency more than 20000 Hz are called \_\_\_\_\_.
- (28) A long sighted eye can be corrected by using a \_\_\_\_\_ lens.
- (29) Opposite electric charges \_\_\_\_\_ each other.
- (30) The device used to detect static electric charges on a body is called \_\_\_\_\_.

#### IV Solve the following:

- (31) The length of a minute hand of a clock is 8 cm. Find the displacement and average velocity of the tip of the minute hand when it moves during a time interval from 4:15pm to 4:45pm.
- (32) A car starts from rest, attains a velocity of 36 KMPH with an acceleration of  $0.2 \text{ m/s}^2$  travels 9 km with this uniform velocity and then comes to rest with a uniform deceleration of  $0.1 \text{ m/s}^2$ . Find the total time of travel by the car.
- (33) Two balls of identical shape and size, but of different materials are acted upon by the same force, such that the acceleration of the first ball is only one fourth that of the second ball. Calculate the ratio of the mass of the first ball with respect to that of the second ball.
- (34) A solid floats in liquid A with half its volume immersed and liquid B with  $\frac{2}{3}$  of its volume immersed. Find the ratio of densities of the liquid A and B.
- (35) A lead bullet of mass 10 gm travelling at 300 m/s strikes against a block of wood and comes to rest. Assuming 50% of heat is absorbed by the bullet, find the increase in temperature.  
(Sp. Heat of lead =  $150 \text{ J/kg/}^\circ\text{C}$ )
- (36) 25 waves pass through a point in 5 sec. If the distance between one crest and the adjacent trough is 0.05 m. Calculate (a) The frequency (b) The wavelength (c) wave velocity
- (37) The refractive index of water is  $\frac{4}{3}$ . If the speed of light in air is  $3 \times 10^8 \text{ m/s}$ . Find the speed of light in water.
- (38) A cell can supply a charge of 300 coulomb. If the current drawn from the cell is 60 micro amp. Find the time in which cell discharges.

## CHEMISTRY

### I. Define the following

- |                |                     |                          |
|----------------|---------------------|--------------------------|
| (1) Alloy      | (2) Reduction       | (3) Chemical bond        |
| (4) Combustion | (5) Thermo plastics | (6) Ignition temperature |

### II Give balanced equations for the following chemical changes

- (1) Ferric oxide is reduced with charcoal.
- (2) Sodium bicarbonate is treated with sulphuric acid.
- (3) Lead (II) nitrate is strongly heated.

