Santosh Academia Talent Examination
(2024-25)
CLASS-XI (PCM) STUDYING
SAMPLE PAPER

Max. Marks: 120   **Time: 1 Hour**

IMPORTANT INSTRUCTIONS:

GENERAL

1. This booklet is your Question Paper.
2. The Test ID is printed on the left-hand top corner of this sheet. If not, contact the invigilator for change of question paper.
3. Use the Optical Mark Recognition (OMR) sheet provided separately for answering the questions.
   DO NOT FILL till you are told to do so.
4. The test paper SET CODE is printed on the Right-hand top corner of the question paper. Ensure that you fill this in OMR as that on the question paper booklet.
5. Blank spaces are provided within this booklet for rough work. No additional rough sheet will be provided.
6. You are ALLOWED to take away the Question Paper at the end of the examination.

QUESTION PAPER FORMAT

7. This Paper contains **30** questions in total.

   Section-I: Question Number 1 to 6 belongs to Physics.

   Section-II: Question Number 7 to 13 belongs to Chemistry.

   Section-III: Question Number 14 to 20 belongs to Mathematics.

   Section-IV: Question Number 21 to 30 belongs to Mental Ability.

MARKING SCHEME:

8. Each question carries 4 marks. For each correct response, the candidate will get 4 marks.
9. There is a negative marking of -1 mark for incorrect response for section I, II and III. No marks will be deducted for unmarked questions.
10. There is no negative marking for incorrect response or unmarked questions for Section IV.

1. A particle moves in space along the path $z = ax^3 + by^2$ in such a way that $\dfrac{dx}{dt} = c = \dfrac{dy}{dt}$, where a, b and c are constants. The acceleration of the particle is:

(a) $(6ac^2x + 2bc^2)\,\hat{k}$ (b) $(2ax^2 + 6by^2)\,\hat{k}$ (c) $(4bc^2x + 6ac^2)\,\hat{k}$ (d) $(bc^2x + 2by)\,\hat{k}$

2. A stone is projected from a horizontal plane. It attains maximum height 'H' & strikes a stationary smooth wall & falls on the ground vertically below the maximum height. Assume the collision to be elastic, the height of the point on the wall where ball will strike is:
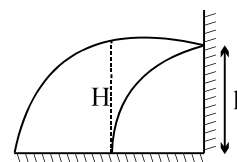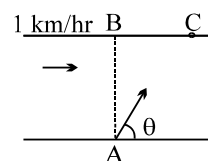
(a) H/2   (b) H/4

(c) 3H/4   (d) None of these

3. A man in a balloon rising vertically with an acceleration of 4.9 m/s^2 releases a ball 2 seconds after the balloon is let go from the ground. The greatest height above the ground reached by the ball is:
(g = 9.8 m/s^2)

(a) 14.7 m   (b) 19.6 m   (c) 9.8 m   (d) 24.5 m

4. A particle is projected at an angle of 45° from a point lying 2 m from the foot of a wall. It just touches the top of the wall and falls on the ground 4 m from it. The height of the wall is:
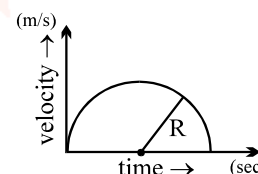
(a) 3/4 m   (b) 2/3 m   (c) 4/3   (d) 1/3 m

5. A river is flowing with a speed of 1 km/hr. A swimmer wants to go to point 'C' starting from 'A'. He swims with a speed of 5 km/hr, at an angle θ w.r.t. the river. If AB = BC = 400 m. Then the value of θ is: $\left[\cos 16° = \dfrac{24}{25}\right]$

(a) 37°   (b) 30°

(c) 53°   (d) 45°

6. Velocity time graph of a particle is in shape of a semicircle of radius R as shown in figure. Its average acceleration from T = 0 to T = R is:

(a) 0 m/s^2 (b) 1 m/s^2

(c) R m/s^2 (d) 2R m/sec^2

SECTION-II CHEMISTRY

7. The number of molecule in 4.25 g of NH_3 is

(a) 1.505×10^{23} (b) 3.01×10^{23} (c) 6.02×10^{23} (d) None of these

8. If 0.5 mol of $BaCl_2$ is mixed with 0.1 mole of Na_3PO_4, the maximum number of mole of $Ba_3(PO_4)_2$ that can be formed is $3BaCl_2 + 2Na_3PO_4 \longrightarrow Ba_3(PO_4)_2 + 6NaCl$

    (a)   0.7   (b)   0.05   (c)   0.30   (d)   0.10

9. If the radius of first Bohr orbit of hydrogen atom is 'x', then de Broglie wavelength of electron in 3rd orbit is nearly

    (a) $2\pi x$ (b) $6\pi x$ (c) $9x$ (d) $\dfrac{x}{3}$

10. Among the following species, identify the isostructural pairs

NF_3, NO_3^-, BF_3, H_3O^+, HN_3

    (a) $[NF_3, NO_3^-]$ and $[BF_3, H_3O^+]$ (b) $[NF_3, HN_3]$ and $[NO_3^-, BF_3]$

    (c) $[NF_3, H_3O^+]$ and $[NO_3^-, BF_3]$ (d) $[NF_3, H_3O^+]$ and $[HN_3, BF_3]$

11. For the reaction, $A_{(s)} + 3B_{(g)} \rightarrow 4C_{(g)} + D_{(\ell)}$, ΔH and ΔU are related as ………. .

    (a) $\Delta H = \Delta U$ (b) $\Delta H = \Delta U + 3RT$

    (c) $\Delta H = \Delta U + RT$ (d) $\Delta H = \Delta U - 3RT$

12. Successive ionisation energies of an element 'X' are given below (in kcal)

IP_1 IP_2 IP_3 IP_4

165   195   556   595

Electronic configuration of the element 'X' is

    (a) $1s^2, 2s^2 2p^6, 3s^2 3p^2$ (b) $1s^2, 2s^1$

    (c) $1s^2, 2s^2 2p^2$ (d) $1s^2, 2s^2 2p^6, 3s^2$

13. The number of photons of light having wavelength 100 nm, which can provide 1.00 J energy is nearly

    (a) 10^7 photons   (b) 5×10^{18} photons

    (c) 5×10^{17} photons   (d) 5×10^7 photons

SECTION-III MATHEMATICS

14. Find the least number which when divided by 15 leaves a remainder of 5 when divided by 25 leaves a remainder of 15 and when divided by 35 leaves a remainder of 25

    (a)   515   (b)   525   (c)   1040   (d)   1050

![SANTOSH Deemed to be University]

Head Office: Santosh University, No 1, Santosh Nagar, Pratap Vihar, Ghaziabad
Branch Office: J-10, Aniket Arcade, RDC Ghaziabad. +91 931174 41940, +91 93114 41879

15. If α and β are the zeroes of the quadratic polynomial $f(t) = t^2 - 4t + 3$, then the value of $\alpha^4\beta^3 + \alpha^3\beta^4$ is

    (a)   104   (b)   108   (c)   112   (d)   5

16. If the sum of the ages of a father and his son in years is 65 and twice the difference of their ages in years is 50 then the age of the father in years is

    (a)   45   (b)   40   (c)   50   (d)   55

17. The value of $\sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}$ is

    (a)   4   (b)   3   (c) -2 (d)   3.5

18. The first, second and last terms of an A.P are respectively 4, 7 and 31. How many terms are there in the given A.P.?

    (a)   10   (b)   12   (c)   8   (d)   13

19. In $\triangle ABC$, $\dfrac{AB}{AC} = \dfrac{BD}{DC}$, $\angle B = 70°$ and $\angle C = 50°$. Then $\angle BAD =$

    (a) 30^0 (b) 40^0 (c) 50^0 (d) 45^0
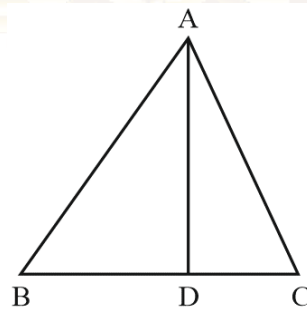
20. Find the ratio in which the point (2, y) divides the line segment joining the point A(–4, 3) and B(6, 3). Also, find the value of y

    (a)   2 : 3, y = 3   (b)   3 : 2, y = 4   (c)   3 : 2, y = 3   (d)   3 : 2, y = 2

SECTION-IV MENTAL ABILITY

Directions (Q. 21 - 22): In the following questions, four options (numbers/number, pairs/letter groups) are given. Three of them are alike in a certain way and one is different. Find the odd one out from the alternatives.

21.   (a) 242   (b) 80   (c) 25   (d) 728

22.   (a) EBD   (b) IFH   (c) QMO   (d) YVX

SANTOSH
Deemed to be University

Head Office: Santosh University, No 1, Santosh Nagar, Pratap Vihar, Ghaziabad
Branch Office: J-10, Aniket Arcade, RDC Ghaziabad. +91 931174 41940, +91 93114 41879

Directions (Q. 23): In the following questions, numbers are written in a sequence. Find the missing number, to replace the question mark, from the given alternatives.

23. KM1, IP3, GS6, EV11, ?

    (a) BX18   (b) BY16   (c) CY18   (d) CZ18

Directions (Q. 24-25): Find out the wrong number in the series:

24. 2, 3, 4, 6, 12, 12, 48, 24, 250

    (a) 4   (b) 6   (c) 24   (d) 250

25. 3, 11, 31, 68, 131, 223

    (a) 131   (b) 68   (c) 223   (d) 31

26. If the word TRIPPLE is coded as DMOQHSS, how the word VICTORY will be coded?

    (a) UJBUNSX   (b) WHDSPQZ   (c) XSNUBJU   (d) ZXPSDHW

27. If the word GRANDEUR is coded as NARGRUED, which word will be coded as SERPEVRE?

    (a) PERSERVE   (b) PRESEVER   (c) PERSEVER   (d) PRESERVE

Directions (Q. 28 - 30): Study the information given below and answer the questions that follow:

(i) P, Q, R, S, T and U are six students procuring their Master's degree in six different subjects-English, History, Chemistry, Physics, Hindi and Mathematics.

(ii) Two of them stay in a hostel, two stay as Paying Guest (PG) and the remaining two stay at home.

(iii) R does not stay as PG and studies Chemistry.

(iv) The students studying Hindi and History do not stay as Paying Guest (PG).

(v) T studies Mathematics and S studies Physics.

(vi) U and S stay in a hostel. T stays as Paying Guest (PG) and Q stays at home.

28. Who studies English?

    (a) R   (b) P   (c) S   (d) T

29. Which of the following combinations of subject and place of stay is not correct?

    (a) English-Hostel   (b) Chemistry-Home

    (c) Mathematics-Paying Guest   (d) Physics-Hostel

30. Which of the following pairs of students stay one each at hostel and at home?

    (a) QR   (b) SR   (c) PQ   (d) PS

SANTOSH
Deemed to be University

Head Office: Santosh University, No 1, Santosh Nagar, Pratap Vihar, Ghaziabad
Branch Office: J-10, Aniket Arcade, RDC Ghaziabad. +91 931174 41940, +91 93114 41879

ROUGH WORK