Santosh Academia Talent Examination

(2024-25)

CLASS-XI (PCB) 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 5 belongs to Physics.
Section-II: Question Number 6 to 10 belongs to Chemistry.
Section-III: Question Number 11 to 15 belongs to Botany.
Section-IV: Question Number 16 to 20 belongs to Zoology.
Section-V: 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 III and IV. No marks will be deducted for unmarked questions.

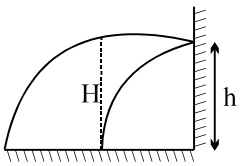
10. There is no negative marking for incorrect response or unmarked questions for Section V.

SECTION-I PHYSICS

1. A particle moves in space along the path $z = ax^3 + by^2$ in such a way that $\frac{dx}{dt} = c = \frac{dy}{dt}$, 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

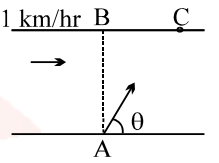
3. A man in a balloon rising vertically with an acceleration of 4.9 m/s^2 releases a ball 2 seconds after the balloon is let go from the ground. The greatest height above the ground reached by the ball is:
($g = 9.8\ m/s^2$)

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

4. The velocity at the maximum height of a projectile is half its initial velocity of projection. Its range on the horizontal plane is:

(a) $\frac{\sqrt{3}u^2}{2g}$ (b) $\frac{u^2}{2g}$ (c) $\frac{3u^2}{2g}$ (d) $\frac{3u^2}{g}$

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: $\left[\cos 16^\circ = \frac{24}{25}\right]$



(a) 37° (b) 30°

(c) 53° (d) 45°

SECTION-II CHEMISTRY

6. 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

7. 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]

8. 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) $\Delta H = \Delta U - 3RT$

9. In the isoelectronic species, the ionic radii (A) of N^{3-}, O^{2-} and F^- are respectively given by

(a) 1.36, 1.40, 1.71 (b) 1.36, 1.71, 1.40

(c) 1.71, 1.40, 1.36 (d) 1.71, 1.36, 1.40

10. 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) $1s^2$, $2s^2 2p^6$, $3s^2$

SECTION-III BOTANY

11. The term cell was given by

(a) Robert Hooke (b) Tatum (c) Schwann (d) De Bary

12. Photosynthesis occurs in

(a) Chloroplast (b) Golgi body

(c) Endoplasmic reticulum (d) Nucleus

13. Water is absorbed by

(a) Root cap (b) Root apex (c) Root hairs (d) Root cortex

14. One of the first acts in taxonomy is

(a) Identification (b) Description (c) Naming (d) Classification

15. The rate of transpiration will _____ if the atmospheric pressure is low

(a) Increase (b) Decrease

(c) Stay unchanged (d) Can't be determined

SECTION-IV ZOOLOGY

16. Which class has the largest number of animals?

(a) Fishes (b) Reptiles (c) Insects (d) Mammals

17. The normal diastolic blood pressure in a normal healthy adult human is

(a) 80 mm Hg (b) 60 mm Hg (c) 90 mm Hg (d) 120 mm Hg

18. Which of the following arteries does not carry oxygenated blood?

(a) Systemic (b) Hepatic (c) Pulmonary (d) Cardiac

19. Which is the longest segment of the digestive system in the human body?

(a) Pancreatic duct (b) Small intestine (c) Large intestine (d) oesophagus

20. The human nervous system is capable of a wide range of functions. What is the basic unit of the nervous system?

(a) Glia cell (b) Meninges

(c) Neuron (d) Cerebrospinal fluid

SECTION-V MENTAL ABILITY

Directions (Q. 21): 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) EBD (b) IFH (c) QMO (d) YVX

Directions (Q. 22 - 23): In the following questions, numbers are written in a sequence. Find the missing number, to replace the question mark, from the given alternatives.

22. KM1, IP3, GS6, EV11, ?

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

23. 4, 5, 7, 10, 11, 13, 16, ?

(a) 48 (b) 38 (c) 20 (d) 14

Directions (Q. 24 & 27): 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

ROUGH WORK