

MOTION TALENT SEARCH EXAMINATION

SESSION - 2024-25

CLASS : 10th

QUESTION PAPER

CANDIDATE'S NAME : _____

DURATION: 60 MINUTES

TOTAL QUESTIONS: 31

MAXIMUM MARKS : 124

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| 1. The paper consists of five sections :- Physics, Chemistry, Biology, Mathematics and Mental Ability. | 3. There is only one correct answer hence mark one choice only. |
| 2. All questions are compulsory and carry four marks each. One mark will be deducted for each wrong answer. | 4. Darken your choice in OMR Sheet with Blue/ Black Ball Point Pen. |
| | 5. Return the OMR Sheet to the invigilator at the end of the exam. |

PHYSICS

Comprehension/Passage (Q.1 to 3):

The distinction between mass and weight is unimportant for many practical purposes because the strength of gravity is very similar everywhere on the surface of the Earth. In such a constant gravitational field, the gravitational force exerted on an object (its weight) is directly proportional to its mass. So, if object A weighs, say, 10 times as much as object B, then the mass of object A is 10 times that of object B. This means that an object's mass can be measured indirectly by its weight. For example, when we buy a bag of sugar we can measure its weight (how hard it presses down on the scales) and be sure that this will give a good indication of the quantity that we are actually interested in, which is the mass of sugar in the bag. Nevertheless, slight variations in the Earth's gravitational field do exist. These alter the relationship between weight and mass, and must be taken into account in high precision weight measurement that are intended to indirectly measure mass.

The SI unit of mass is kg and that of weight is N. Mass can be measured by a physical or a beam balance. Weight can be measured by a spring balance.

- 1.** The mass of a body is measured to be 12 kg on earth. If it is taken to the moon, its mass will be

- (A) 12 kg (B) 2 kg
(C) 6 kg (D) 72 kg

- 2.** Find out correct statement :-
(A) mass and weight both are constant throughout universe.
(B) mass varies from planet to planet.
(C) weight is measure in kg.
(D) gravitational force increase in same proportion as mass of object increases.
- 3.** Beam balance is used to measure :-
(A) mass (B) weight
(C) both (A) & (B) (D) None of these

Comprehension/Passage (Q.4 to 6):

All oscillatory motion are periodic but not every periodic motion are oscillatory.

Simple harmonic motion is a special type of periodic motion in which the restoring force is directly proportional to the displacement and is always directed towards the mean position.

If the time period of a simple pendulum is two seconds, then it is known as a second's pendulum.

A wave can be described as a vibratory disturbance through a medium from one point to another point,

in which only energy and momentum are transferred from one point to another point without any actual movement of matter between the two points.

Mechanical waves are those waves which require a material medium (such as, solid, liquid or gas) for their production and propagation. Examples are waves on the surface of water, sound waves, and waves on strings and springs.

Electromagnetic waves are those waves which do not require any material medium for their production and propagation.

A wave is uniquely identified by its characteristics, which are its amplitude, frequency, velocity and time period.

Sound is produced by vibrating objects. Sound waves travel by transmission of vibrations from source to destination through some medium such as air, water or a solid. Sound wave propagates in the form of compressions and rarefactions. A substance in which sound waves travel is called a sound medium.

4. Non-mechanical (electromagnetic) wave can propagate in :
 - (A) material medium as well as vacuum
 - (B) in vacuum, but not in material medium
 - (C) in material medium but not in vacuum
 - (D) neither in material medium nor in vacuum
5. Sound energy is basically:
 - (A) mechanical energy
 - (B) electromagnetic energy
 - (C) potential energy
 - (D) electrical energy
6. Sound waves in air are _____ waves.
 - (A) longitudinal
 - (B) radio
 - (C) transverse
 - (D) electromagnetic

CHEMISTRY

Comprehension/Passage (Q.7 to 9):

Crystallisation is a process that separates a pure solid in the form of its crystals from a solution. A solid can also be separated from its solution by evaporation. However crystallisation technique is better than simple evaporation technique. We can get an impure sample of a solid even after evaporation. Some solids decomposes or some may get charred on heating to dryness during evaporation.

7. Crystallisation process is used in one of the following processes.

(A) Purification of salt that we get from sea water

(B) To separate salt from sea water

(C) To separate camphor from salt

(D) To separate colours in a dye

8. Crystallisation is a better process than evaporation because:

(A) it takes lesser time

(B) some impurities may remain in the filtrate which remain with the solid after evaporation

(C) some solid is lost during evaporation

(D) chemical properties change during evaporation

9. What type of mixtures are separated by crystallisation?

(A) A mixture in which one component is soluble in a solvent

(B) A mixture in which impurities are soluble in a solvent

(C) A mixture in which both the components are soluble in a solvent

(D) A mixture in which both the components are insoluble in water

Comprehension/Passage (Q.10 to 12):

The maximum number of the electrons which are permitted to be assigned to an energy shell of an atom is called the electron capacity of that shell. The distribution of electron in different orbits or shells is governed by a scheme known as Bohr-Bury scheme. According to this scheme:

- (i) The maximum number of the electrons that can be present in any shell is given by the formula $2n^2$ where n is the number of energy level.
- (ii) The maximum number of electrons that can be accommodated in the outermost shell is 8.

Electrons are filled in the shells in a stepwise manner in increasing order of energy of the energy shell.

10. What is the maximum electrons capacity of N shell?

(A) 24

(B) 8

(C) 18

(D) 32

11. Identify the element with the configuration K-2, L-8, M-3.

(A) Aluminium

(B) Magnesium

(C) Sodium

(D) Beryllium

12. Which of the following configurations represent sodium?

(A) 2, 8, 4

(B) 2, 8, 5

(C) 2, 3

(D) 2, 8, 1

BIOLOGY

Comprehension/Passage (Q.13 to 15):

Chloroplasts are the most important plastids of all types because they carry out photosynthesis. Like mitochondria, they also have double membrane but no cristae. The space enclosed within the chloroplast is filled with a jelly-like fluid called stroma or matrix. Located in the stroma are present numerous thylakoids. The photosynthetic pigments such as chlorophyll a, chlorophyll b, carotenes and xanthophylls are present along the inner side of the thylakoids. These pigments occurring as photosynthetic units are called photosystems. A number of thylakoids are organised like a pile of coins to form a granum. The grana lying adjacent to each other are connected by stroma lamellae or frets. Plastids, like mitochondria, have their own DNA and ribosomes.

13. Chloroplast are absent in:
 - (A) animals and plants
 - (B) fungi and animals
 - (C) animals, bacterium and fungi
 - (D) none of these
14. Organelle covered by double membrane is:
 - (A) Golgi body
 - (B) Mitochondria
 - (C) Plastids
 - (D) Both (B) & (C)
15. Structural elements of chloroplasts are:
 - (A) Plastids
 - (B) Photosynthetic pigments
 - (C) Thylakoids
 - (D) Quantasomes

Comprehension/Passage (Q.16 to 18):

Kingdom Animalia includes about 1.3 million animal species with great diversity in their living forms. They differ from one another with respect to size, external and internal morphology, behaviour, physiology, and mode of reproduction which makes difficult for one to study each animal in detail. To overcome this problem, animals are classified on the basis of their general characteristics: Levels of Organisation, Symmetry, Metamerism (Segmentation), Germ Layers, Coelom or Body Cavity, Body Temperature, Skeleton.

16. Bilateral symmetry is seen in:
 - (A) Mollusca
 - (B) Protozoa
 - (C) Planaria
 - (D) Sponges

17. Open circulatory system occurs in:
 - (A) Earthworm
 - (B) Hydra
 - (C) Planaria
 - (D) Cockroach

18. Tissue level of organization is found in:
 - (A) Porifera
 - (B) Coelenterata
 - (C) Annelida
 - (D) Vetebrate

MATHEMATICS

Comprehension/Passage (Q.19 to 21):

An ordered pair is the solution of a given linear equation in two variables if it satisfies the equation.

19. Which of the following is solution of $x + 7y = 0$?
 - (A) (0, 7)
 - (B) (7, 0)
 - (C) (0, 0)
 - (D) (0, -7)
20. $(\sqrt{2}, 4\sqrt{2})$ is a solution of the equation $x - 2y = k$, if $k =$
 - (A) $7\sqrt{2}$
 - (B) $8\sqrt{2}$
 - (C) $-7\sqrt{2}$
 - (D) $-8\sqrt{2}$
21. The value of k if $x = -2$, $y = 1$ is a solution of $2x + 3y = k$, is
 - (A) -7
 - (B) 0
 - (C) -1
 - (D) 7

Comprehension/Passage (Q.22 to 24):

A closed rectangular box of length, breadth and height are 3m, 2m and 1m, respectively.

22. Cost of cloth to cover box completely if 1m² cloth cost ₹10 is:
 - (A) ₹ 22
 - (B) ₹ 220
 - (C) ₹ 2200
 - (D) ₹ 200
23. The length of longest rod that can be kept in the box is:
 - (A) 3m
 - (B) $\sqrt{10}$ m
 - (C) $\sqrt{12}$ m
 - (D) $\sqrt{14}$ m
24. If one side (2m × 1m) of the box is removed, then surface area of remaining box is:
 - (A) 22 m²
 - (B) 18 m²
 - (C) 20 m²
 - (D) 6 m²

MENTAL ABILITY
Comprehension/Passage (Q.25 to 27):

The capital letters in each of the following words are coded and written in small letters on the right side of each word. But these letters are not in order. Find out the codes for letters and answer the questions.

Column I	Column II
PROBLEM	g r c a t s d
ROMAN	c f t x s
LAME	f g a t
BOLD	g c d z

25. What is the code for letter A ?
 (A) t (B) g
 (C) f (D) a
26. What is the code for letter B ?
 (A) g (B) c
 (C) d (D) z
27. What would be the code (in correct order) for the word 'MODE' ?
 (A) t f z c (B) c t f z
 (C) f t c z (D) t c z a

Comprehension/Passage (Q.28 to 31) :

A, B, C, D, E and F are members of a family. Amongst them there are lawyer, doctor, teacher, salesman, engineer and an accountant. There are two married couples in the family. 'D' who is a salesman is married to the lady teacher. Doctor is married to the lawyer. 'F' who is an accountant is son of 'B' and also brother of 'E'. 'C' who is lawyer is daughter in law of 'A'. E is an unmarried engineer. 'A' is grand mother of 'F'.

28. What is the profession of A ?
 (A) Teacher (B) Doctor
 (C) Lawyer (D) Engineer
29. What is the relation of B with D ?
 (A) Brother (B) Grandson
 (C) Son (D) Father
30. What is the relation of D with F ?
 (A) Husband (B) Brother
 (C) Father (D) Grandfather
31. Which of the following is a married couple ?
 (A) C and D (B) A and B
 (C) B and C (D) D and B