

The test paper will have four sections : Mathematics and logic (20 Qs), Physics (20 Qs), Chemistry (20 Qs) and Biology (40 Qs). Each question will have 4 choices, of which one is correct. The correct answer carries 2 marks, and a wrong answer carries -1 mark.

Mathematics

1. When 4 dice are thrown, what is the probability that the same number appears on each of them?
(a) $1/36$ (b) $1/216$ (c) $1/64$ (d) $1/18$
2. If we evaluate the sequence $S = 1 + (1/2) + (1/3) + (1/4) + (1/5) + \dots + (1/1000)$ the sum will be closest to
(a) Infinity (b) 1000 (c) 10 (d) 100
3. The slope of the tangent to the parabolic curve $y = 2x^2$ at $x=3$ is equal to
(a) 18 (b) 22 (c) 0.12 (d) 12
4. A cylinder of length L and cross sectional radius R has same volume as a sphere of radius R . The relationship between R and L can be written as
(a) $3L = 4R$ (b) $4L = 3R$ (c) $L = R$ (d) $L = -R$
5. Four objects (A,B,C and D) are placed in these ways ----- B is toward east of C at a distance of 10cm, A is at a distance of 10cm. toward east of D but at a distance of 15cm, toward south of B. If the distance of D from C is also 15cm. to which side of C does it lie ?
(a) North (b) South-East (c) South-West (d) South
6. Using the numbers 2,4,6 and 8, how many 3 digit numbers can we create, if we allow repeats?
(a) 32 (b) 64 (c) 12 (d) 384

Physics

1. The quantity that is measured in a calorimetric study is
a) energy stored in food substances b) heat c) color d) wavelength
2. Which of the following does not describe a property of transverse waves
a) Wavelength b) phase c) decibel d) path difference
3. While viewing a ship approaching from a distance in the middle of a sea, the top portion of the ship is visible first and then the rest of it, from top to bottom. This observation proves that
a) gravity does not exist in the sea b) the sky acts as a concave lens
c) the earth is round d) parallel lines meet at infinity
4. The effect of three point charges on a test charge at a distance is 'd' from the centroid of the charges will be a/an ____ of the effects of individual charges
a) vector addition b) algebraic addition c) scalar triple product d) independent
5. When a semiconductor is heated, its electrical conductivity ____
a) decreases b) increases c) remains the same d) becomes infinite
6. Which of the following is an ionizing radiation
a) gamma rays b) visible light c) microwave d) oceanic waves

Chemistry

1. In the crystalline form of sodium chloride, one Na^+ ion is surrounded by
(a) 1 Cl^- ion (b) 4 Cl^- ions (c) 1 Cl^+ ion (d) 6 Cl^- ions
2. Find empirical formula of the compound if M=68% (atomic mass=34) and remaining 32% is oxygen
(a) MO (b) M₂O (c) M₃₄O₃₂ (d) M₆₈O₃₂

3. Which of the following is not a mixture?

- (a) Milk (b) Distilled alcohol
(c) Liquefied Petroleum Gas (d) Iodized table salt

4. H-O-H bond angle in water is

- (a) 104.5° (b) 90.5° (c) 175.5° (d) -10.45°

5. The concentration of hydroxyl ions in a sample of soft drink is 10 mM. The value of the pH is

- (a) 2 (b) 16 (c) 7 (d) 12

6. The number of structural isomers possible from the molecular formula $C_3H_9N_4$ is

- (a) 4 (b) 16 (c) 9 (d) Infinite

Biology

1. What are the differences between fungi and higher plants?

- (a) Mitochondria and Chloroplast (b) Chloroplast and Nucleus
(c) Chloroplast and Nutrition (d) Chromosomes and pathogenicity

2. A human female haploid (n) cell contains_____ keep this

- (a) Y chromosome (b) X and Y chromosomes
(c) 2X chromosomes (d) X chromosome

3. Which of these is a secondary metabolite?

- (a) Sucrose (b) Water (c) Penicillin (d) Penicillium

4. The cyanobacteria are also referred to as

- (a) Rhizobium (b) Protists
(c) Blue-green algae (d) slime moulds

5. What is the major contribution of Gregor Johann Mendel?

- (a) Laws of inheritance
- (b) Laws of evolution
- (c) Laws of genomics
- (d) Laws of gravity

6. A secondary growth of stems in plants involves:

- (a) phloem companion cell migration
- (b) vascular cambium
- (c) xylem degradation
- (d) death of meristematic cells