Section : I - Aptitude and Logical Reasoning

1. Select the pair in which the numbers are similarly related as in the given pair.
9 : 27 : : ___ : ___
(a) 5 : 125 (b) 8 : 64 (c) 15 : 135 (d) 81 : 729

2. In a certain code language, '3a, 2b, 7c' means 'Truth is Eternal';
'7c, 9a, 8b, 3a' means 'Enmity is not Eternal' and
'9a, 4d, 2b, 8b' means 'Truth does not perish'.
Which of the following means 'enmity' in that language ?
(a) 3a (b) 7c (c) 8b (d) 9a

3. (i) In a family of six persons A, B, C, D, E and F, there are two married couples.
(ii) D is grandmother of A and mother of B.
(iii) C is wife of B and mother of F.
(iv) F is the grand daughter of E.
Who among the following is one of the couples ?
(a) CD (b) DE (c) EB (d) none of these

4. What letter will come in place of question mark?
L J H
J P D
P ? E
(a) K (b) L (c) P (d) I

5. Two bus tickets from city A to B and three tickets from city A to C cost Rs. 77 but three tickets from city A to B and two tickets from city A to C cost Rs. 73. What are the fares for cities B and C from A ?
(a) Rs.4, Rs. 23 (b) Rs. 13, Rs. 17 (c) Rs. 15, Rs. 14 (d) Rs. 17, Rs. 13

Section : II - Mathematics

6. Write 0.135135 …. In the form of $\frac{p}{q}$.
(a) $\frac{5}{37}$ (b) $\frac{17}{37}$ (c) $\frac{19}{7}$ (d) $\frac{19}{111}$

ROUGH SPACE

7. The sum of two irrational number is always
(a) Rational (b) Irrational (c) Real (d) Integer

8. Express $0.45\overline{235}$ as a fraction.
(a) $\frac{1419}{99900}$ (b) $\frac{14190}{9990}$ (c) $\frac{1491}{9990}$ (d) $\frac{4519}{9990}$

9. What is the least positive fraction that must be added $1\frac{1}{3} \div 1\frac{1}{2} \div 1\frac{1}{9}$ to make the result an integer?
(a) $\frac{1}{5}$ (b) $\frac{3}{5}$
(c) $\frac{2}{5}$ (d) more than one of the above

10. If the numerator of a fraction is increased by 150% and the denominator of a fraction is increased by 200%, the fraction becomes $\frac{10}{19}$. Find the fraction.
(a) $\frac{20}{29}$ (b) $\frac{12}{19}$ (c) $\frac{15}{29}$ (d) $\frac{13}{19}$

11. $\sqrt{0.0064} + \sqrt{2.25} + \sqrt{2.89}$ is equal to:
(a) 3.28 (b) 23 (c) 1 (d) 2

12. If $3^{4x-2} = 729$, then find the value of x.
(a) 4 (b) 3 (c) 2 (d) 5

13. In the quesitons, two equations I and II are given. You have to solve both the equations to establish the correct relation between x and y and choose the correct option.
I. $3x^2 + (35-4)x + 25 = 2x^2 + 21x + 20^2$
II. $y^2 + 90 \times 4 = \left(4^3 - \sqrt{676}\right)y$
(a) $x > y$ (b) $x < y$
(c) $x = y$ or the relationship cannot be established (d) $x \geq y$

ROUGH SPACE

14. If $x - \frac{1}{x} = 3$, the value of $x^3 - \frac{1}{x^3}$ is
(a) 36 (b) 63 (c) 99 (d) none of these

15. If $p + q + r = 5$; $p^3 + q^3 + r^3 = 30$ and $p^2 + q^2 + r^2 = 15$, then find 3pqr?
(a) – 20 (b) 20 (c) 25 (d) – 25

Section : III - Science

16. A solid cubical block has a total surface area of 600 cm^2 and is made of a material with a density of 8 g/cm^3.
If the block is placed on a flat, horizontal table, what is the pressure it exerts on the table due to its weight? (Assume g = 10 m/s^2).
(a) 800 Pa (b) 8 kPa (c) 80 kPa (d) 800 kPa

17. Which of the following expressions represents the longest duration of time?
(a) 100 millisecond (b) 10^7 nanosecond (c) 10^{-5} megasecond (d) 10^5 microsecond

18. A space probe is coasting through deep space for from any major gravitational influence. It is moving at a constant velocity of 10,000 m/s towards a distance star. What is the magnitude of the net force acting on the probe?
(a) 10,000 N (b) Grater than zero, but less than 10,000
(c) Less than zero (d) Zero

19. Two different objects, X and Y have the same mass. Object X is pushed with a constant force F_X and accelerates at 2 m/s^2. Object Y is pushed with a constant force F_Y and accelerates at 6 m/s^2.
What is the relationship between the magnitude of F_X and F_Y?
(a) $F_Y = 3F_X$ (b) $F_Y = 1/3F_X$ (c) $F_Y = 2F_X$ (d) $F_Y = 4F_X$

20. Which statement accurately describes the characteristics of Pressure?
(a) It is a Base Quantity and a Vector. (b) It is a Derived Quantity and a Vector.
(c) It is a Base Quantity and a Scalar. (d) It is a Derived Quantity and a Scalar.

ROUGH SPACE

21. "The tip of a common nail is made sharp. "Which statement below correctly describes the relationship between the variables involved when hammering the nail into a piece of wood?
(a) The Area (A) of contact is increased to maximize the Force (F).
(b) The Force (F) applied is increased to maximize the Pressure (P).
(c) The Pressure (P) is reduced by increasing the Area (A).
(d) The Area (A) of the tip is reduced to greatly increases the Pressure (P) for a given Force (F).

22. "A massive rocket accelerates skyward despite its enormous weight. "Which formula best explains the relationship between the thrust force and the rocket's Change in motion?
(a) $E = mc^2$ (b) $F = \Delta p / \Delta t$ (c) $F = -kx$ (d) $E = hf$

23. A wave's speed (v) increases as it moves from one medium to another, but its frequency (f) remains constant. Based on the wave equation $\nu = f\lambda$, what must happen to the wave's wavelength (λ)?
(a) It decreases (b) it remains unchanged
(c) its increases (d) it becomes zero

24. Compressions and rarefactions are regions of high and low density, respectively, that characterize the propagation of which type of wave?
(a) Water waves (b) Light waves
(c) Electromagnetic waves (d) Longitudinal waves

25. A distress flare is launched 1650 m away from an observer. Given the speed of sound in air is 330 m $\cdot s^{-1}$, how long after seeing the flash will the observer hear the sound? (Assume the time for light to travel is negligible.)
(a) 0.2 s (b) 3.0 s (c) 5.0 s (d) 550 s

26. Which postulates of Dalton Atomic Theory gives laws of conservation of mass?
(a) Atom of same elements are similar
(b) Atoms of different elements are different
(c) Atom can neither be created nor be destroyed
(d) Atom combine in fixed ratio to form compound.

27. Which of the following points of Dalton atomic theory is true according to modern atomic theory'?
(a) Matter consists of small indivisible particles called atoms
(b) Atoms of same element are alike in all respects
(c) Atoms combine in small whole numbers to form compound atoms (molecules)
(d) Atom is the smallest unit of matter, which takes part in a chemical reaction

ROUGH SPACE

28. According to Dalton's Atomic Theory, matter consists of indivisible _____.
(a) Molecules (b) Atoms (c) Ions (d) Mixtures

29. All atoms of a given element have identical _____ including identical _____.
(a) Properties, mass (b) Weight, volume
(c) Volume, properties (d) Temperature, pressure

30. Cathode rays are:
(a) Electromagnetic waves (b) Stream of α – particles
(c) Stream of electrons (d) Radiations

31. Silk fibres are made up of
(a) vitamin (b) carbohydrates (c) protein (d) none of the above

32. Nylon is useful because of following properties:
(a) soft, strong and light
(b) transparent, light and easy to wash
(c) strong, elastic and light
(d) hard, inexpensive and strong

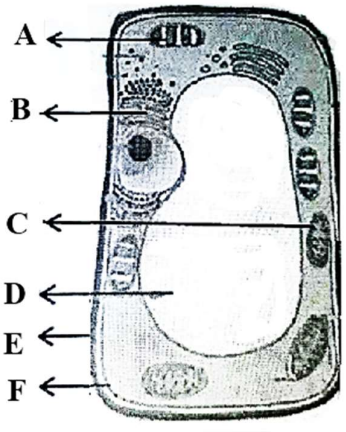
33. Which of the following statements is NOT TRUE?
(a) Polymer occur in nature
(b) Cellulose is made up of glucose units
(c) Nylon is used to make parachute
(d) Cotton thread is stronger than nylon thread

34. PET is a familiar form of
(a) Plastic (b) Polyester (c) Acrylic (d) Rayon

35. Fruits have their characteristic smell because of a chemical known as:
(a) Yeast (b) Aedes (c) Cellulose (d) Esters

ROUGH SPACE

36. Identify the correct parts labelled as C, D, E, F



	C	D	E	F
(a)	Plasma membrane	Endoplasmic reticulum	Vacuole	Cell wall
(b)	Cell membrane	Nucleus	Cytoplasm	Cell wall
(c)	Mitochondria	Vacuole	Cell wall	Cell membrane
(d)	Chloroplast	Cell wall	Nucleus	Mitochondria

37. Which of the following is not different between E.coli and Spirogyra?
(a) Cell membrane (b) Cell wall
(c) Chromosomal organization (d) Ribosomes

38. Structures created by stacking of organized flattened membranous sacs in the chloroplasts are ____.
(a) Grana (b) Cristae (c) Stroma (d) Stroma lamellae

39. _____ is not present in the cell membrane.
(a) Carbohydrates (b) Phospholipids (c) Protein (d) Proline

40. The longest cell is _____ in the human body.
(a) Nerve cell (b) Muscle cell (c) Liver cell (d) Kidney cell

41. *Saccharomyces cerevisiae* is another name for ?
(a) Yeast (b) Lactobacillus (c) Rhizopus (d) Acidophilus

ROUGH SPACE

42. The process of fermentation as discovered by _____.
(a) Fleming (b) Robert Brown (c) Louis Pasteur (d) All

43. The lactose in milk is converted into lactic acid by _____ respiration
(a) Anaerobic (b) aerobic (c) both a and b (d) photo

44. The habitat for micro-organisms can be _____.
(a) Air (b) water (c) soil (d) All

45. Breads, cakes and pastry become soft and fluffy due to which gas ?
(a) N_2O (b) CO_2 (c) CO (d) NO

ROUGH SPACE