

KH

Exam for
Young Scientists..!



J-2025



SAMPLE QUESTIONS PAPER

CLASS 9

Science Aptitude Test

SCIENCE APTITUDE TEST

IIT Ashram

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Vasna - Bhayli Branch : Akshar Pavilion,
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9227777098 / 8460009041

SCIENCE APTITUDE TEST

TIME : 3 HOURS

MAX MARK : 400

INSTRUCTIONS

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

Caution : Class, as given on paper above MUST be correctly marked on the answer OMR sheet before attempting the paper. Wrong Class will give wrong results.

1. This booklet consists of 100 questions. Question paper consists of 4 sections. Marking scheme is given in table below:

Section	Subject	Questions No.	Making Scheme for each questions	
			Correct Answer	Wrong Answer
PART - I	Mental Ability	15	4	-1
PART - II	Mathematics	40	4	-1
PART - III	Physics & Chemistry	30	4	-1
PART - IV	Biology	15	4	-1

2. Answers have to be marked on the OMR sheet. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
3. Blank papers, cellular phones, smart watches, log tables, slide rule, calculator and electronic devices, in any form, are not allowed.

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PART - I : MENTAL ABILITY

1. If you start with a value of 8 and then apply the following algorithm, what is the end result?

Step 1 : Add 9 to input

Step 2 : Subtract 2

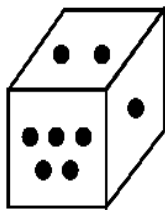
Step 3 : If less than 12, jump to step 1 and continue from there; otherwise proceed to step 4

Step 4 : Add 5

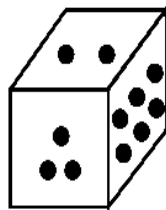
Step 5 : If greater than 16, subtract 3.

Step 6: Print value obtained in step 5

- (a) 11 (b) 17
(c) 20 (d) 15
2. What day it was on 1st September 1985?
(a) Monday (b) Tuesday
(c) Wednesday (d) Sunday
3. From his house, Kabir went 15 km to the North. Then he turned West and covered 10 km. Then, he turned South and covered 5 km. Finally turning to East and he covered 10 km. In which direction is he from his house?
(a) East (b) West
(c) North (d) South
4. When number 1 is at the top, which number will be at the bottom?



(i)



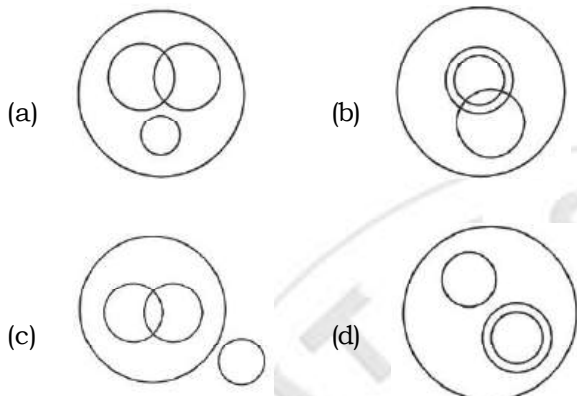
(ii)

- (a) 1 (b) 2
(c) 3 (d) 6

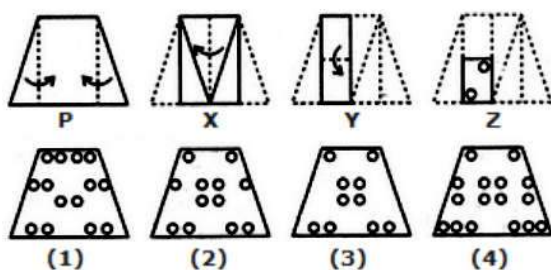
5. Find the missing term -
6, 24, 60, 120, 210, 336, ?, 720
(a) 496 (b) 502
(c) 504 (d) 498
6. If ANCE is coded as 3, 7, 29, 11 then BIOL will be coded as :
(a) 5, 31, 21, 25 (b) 5, 31, 19, 25
(c) 5, 29, 19, 25 (d) 5, 29, 19, 17
7. In the given question, three statements of numbers following same rules are given. Find the rule and accordingly find the value of the number.
If $24 + 35 = 28$; $15 + 42 = 24$; $84 + 57 = 48$, then $69 + 37 = ?$
(a) 62 (b) 56
(c) 38 (d) 50
8. Pointing to a woman, Nirmal said, "She is the daughter of my wife's grandfather's only child." How is the woman related to Nirmal?
(a) Wife (b) Sister-in-law
(c) Sister (d) None of these
9. If \div means $+$, $-$ means \div , \times means $-$ and $+$ means \times , then $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1} = ?$
(a) 0 (b) 8
(c) 1 (d) Not defined

Space for Rough Work

10. In a dinner party both fish and meat were served. Some took only fish and some only meat. There were some vegetarians who did not accept either. The rest accepted both fish and meat. Which of the following logic diagrams correctly reflects this situations ?



11. Choose a figure which would most closely resemble the unfolded form of Figure (Z).

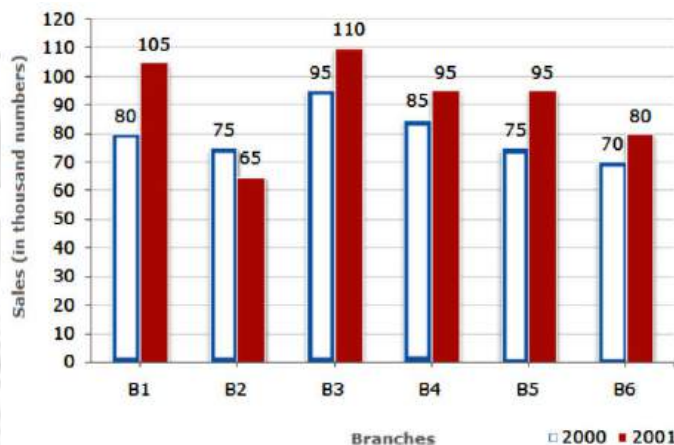


- (a) 1 (b) 2
(c) 3 (d) 4

Direction (Question 12 to Question 15) :

The bar graph given below shows the sales of books (in thousand number) from six branches of a publishing company during two consecutive years 2000 and 2001.

Sales of Books (in thousand numbers) from Six Branches - B1, B2, B3, B4, B5 and B6 of a publishing Company in 2000 and 2001.

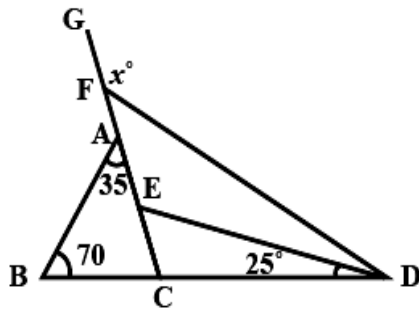


12. What is the ratio of the total sales of branch B2 for both years to the total sales of branch B4 for both years?
- (a) 2:3 (b) 3:5
(c) 4:5 (d) 7:9
13. Total sales of branch B6 for both the years is what percent of the total sales of branches B3 for both the years?
- (a) 68.54% (b) 71.11%
(c) 73.17% (d) 75.55%
14. What percent of the average sales of branches B1, B2 and B3 in 2001 is the average sales of branches B1, B3 and B6 in 2000?
- (a) 75% (b) 77.5%
(c) 82.5% (d) 87.5%
15. What is the average sales of all the branches (in thousand numbers) for the year 2000?
- (a) 73 (b) 80
(c) 83 (d) 88

Space for Rough Work

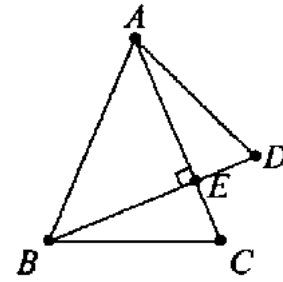
PART - II : MATHEMATICS

1. In the adjoining figure, DE is internal bisector of $\angle D$, find the measure of $\angle x$.



- (a) 155° (b) 105°
 (c) 115° (d) 130°
2. The average weight of Meenu, Binu and Dia is 45 kg. If the average weight of Meenu and Binu is 40 kg and the average weight of Binu and Dia is 43, kg then the weight of Binu is...
- (a) 17 kg (b) 20 kg
 (c) 26 kg (d) 31 kg
3. If $\sqrt{\frac{6+2\sqrt{3}}{33-19\sqrt{3}}} = a + b\sqrt{3}$; $a, b > 0$ then value of
- (a + b)
 (a) 7 (b) 8
 (c) 9 (d) -8
4. If M is 30% of Q, Q is 20% of P, and N is 50% of P, then $M/N =$
- (a) $\frac{3}{250}$ (b) $\frac{3}{25}$
 (c) 1 (d) $\frac{6}{5}$
5. The degree of the polynomial $3x^2 + 12 - (\sqrt{3x + \sqrt{12}})^2 + 12x + 14$ is
- (a) 1 (b) 2
 (c) 4 (d) 0

6. Triangles ABC and ABD are isosceles with $AB = AC = BD$, and BD intersects AC at E. If $BD \perp AC$, then $(\angle C + \angle D)$ (in degrees) is



- (a) 115 (b) 130
 (c) 135 (d) is not uniquely determined
7. The sum of the remainders obtained when $2x^3 + (p+2)x + p - 2$ is divided by $x - 2$ and when it is divided by $x + 1$ is 0. Find the value of p.
- (a) 3 (b) -2
 (c) -4 (d) 8
8. A rationalising factor of $2^{1/3} + 2^{-1/3}$ is
- (a) $2^{2/3} - 1 + 2^{-2/3}$ (b) $2^{1/3} - 1 + 2^{-1/3}$
 (c) $2^{1/3} + 1 + 2^{-1/3}$ (d) $2^{2/3} + 1 + 2^{-2/3}$
9. If $x = 3 - \sqrt{5}$, then $\frac{\sqrt{x}}{\sqrt{2} + \sqrt{3x - 2}} =$
- (a) $1/\sqrt{5}$ (b) $\sqrt{5}$
 (c) $\sqrt{3}$ (d) $1/\sqrt{3}$
10. If $abx^2 = (a - b)^2 (x + 1)$, then the value of $1 + \frac{4}{x} + \frac{4}{x^2}$ is:
- (a) $\left(\frac{a-b}{a+b}\right)^2$ (b) $\left(\frac{a+b}{a-b}\right)^2$
 (c) $\left(\frac{a}{a+b}\right)^2$ (d) $\left(\frac{b}{a+b}\right)^2$

Space for Rough Work

11. Which of the following may lie outside or on the triangle ?

- (i) Circumcentre (ii) Centroid
(iii) Orthocentre (iv) Incentre
(a) (i), (ii) & (iii) (b) (i) and (ii)
(c) (i) and (iii) (d) All the above

12. For what value of x does $(10^x)(100^{2x}) = 1000^5$

- (a) 1 (b) 2
(c) 3 (d) 4

13. If $a + b + c = 0$, then the value of

$$(a+b-c)^3 + (b+c-a)^3 + (c+a-b)^3 \text{ is}$$

- (a) $(a^3 + b^3 + c^3)$ (b) $a^3 + b^3 + c^3$
(c) $24abc$ (d) $-24abc$

14. If $N > 1$, then $\sqrt[3]{N^3 \sqrt{N^3 \sqrt{N^3 \sqrt{N^3}}}}$ is

- (a) $N^{\frac{1}{27}}$ (b) $N^{\frac{1}{9}}$
(c) $N^{\frac{1}{3}}$ (d) $N^{\frac{13}{27}}$

15. The value of

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots \text{upto 99 terms is}$$

- (a) 9 (b) 10
(c) $1+\sqrt{99}$ (d) $\sqrt{99}-1$

16. The value of $2.\overline{45} + 0.\overline{36}$ is

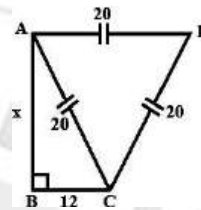
- (a) $\frac{67}{33}$ (b) $\frac{24}{11}$
(c) $\frac{31}{11}$ (d) $\frac{167}{110}$

17. The area of an isosceles right angled triangle is 98 sq. cm. Then its perimeter is

- (a) $14(2-\sqrt{2})\text{cm}$ (b) $14(2+\sqrt{3})\text{cm}$
(c) $12(2+\sqrt{2})\text{cm}$ (d) $14(2+\sqrt{2})\text{cm}$

18. Find the area of Quadrilateral ABCD (in sq. units)

(take $\sqrt{3} = 1.73$)



- (a) 452 (b) 269
(c) 134.5 (d) 144.5

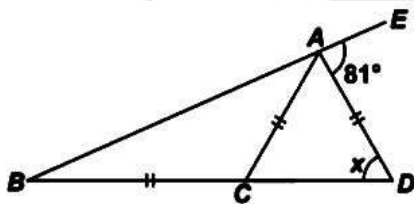
19. Which of the following are the factors of

$$x^2 + \frac{1}{x^2} - 3?$$

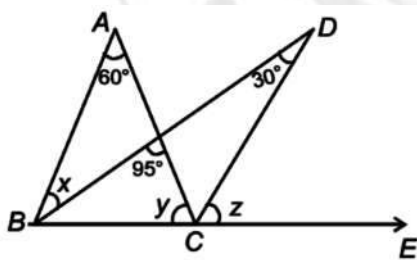
- (a) $\left(x + \frac{1}{x} + 1\right)\left(x + \frac{1}{x} - 1\right)$
(b) $\left(x - \frac{1}{x} + 1\right)\left(x - \frac{1}{x} - 1\right)$
(c) $\left(x + \frac{1}{x} + 1\right)\left(x - \frac{1}{x} - 1\right)$
(d) $\left(x + \frac{1}{x} - 1\right)\left(x + \frac{1}{x} - 1\right)$

Space for Rough Work

20. The average of 9 numbers is 8. What should be added as 10th number to make the average 9?
 (a) 10 (b) 72
 (c) 18 (d) 90
21. If $5\sqrt{5} \times 5^3 \div 5^{-3/2} = 5^{a+2}$, then the value of a is...
 (a) 4 (b) 5 (c) 9 (d) 16
22. 10 years ago Simran's mother was 4 times as old as than her daughter. After 10 years the mother will be twice of her daughter's age. Find the present age of Simran.
 (a) 5 (b) 10
 (c) 20 (d) 30
23. The figure formed by joining the midpoints of the adjacent sides of a quadrilateral is a
 (a) Rhombus (b) Square
 (c) Rectangle (d) Parallelogram
24. In the figure, $BC = AC = AD$, $\angle EAD = 81^\circ$. Find the value of x.



- (a) 45° (b) 54° (c) 63° (d) 36°
25. In the following figure, if ABC and BDC are two triangles, then $(x + y + z)$ equals

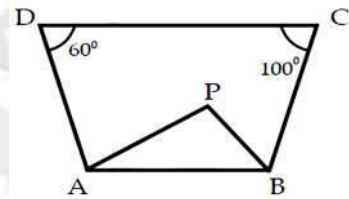


- (a) 120° (b) 150°
 (c) 180° (d) 135°

26. If $2^x = 4^y = 8^z$ and $xyz = 288$, then $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z}$ equals

- (a) $\frac{11}{8}$ (b) $\frac{11}{24}$
 (c) $\frac{11}{48}$ (d) $\frac{11}{96}$

27. In the figure, the bisectors of $\angle A$ and $\angle B$ meet at point P. If $\angle C = 100^\circ$ and $\angle D = 60^\circ$ then measure of $\angle APB$ is



- (a) 45° (b) 70°
 (c) 90° (d) 80°

28. Two toys are sold at Rs .504 each. One toy brings the dealer a gain of 12% and the other a loss of 4%. The gain or loss percent by selling both the toys is

- (a) $3\frac{5}{13}\%$ profit (b) $4\frac{5}{13}\%$ profit
 (c) $5\frac{1}{13}\%$ profit (d) $2\frac{3}{13}\%$ loss

29. If $x = 2^{1/3} + 2^{-1/3}$, then the value of $2x^3 - 6x$ will be..

- (a) 5 (b) -5 (c) 1 (d) 0

30. A toy was sold at a gain of 12%. Had it been sold for Rs 33 more, the gain would have been 14%. Find the cost price of the toy ?

- (a) 1647 (b) 1648
 (c) 1649 (d) 1650

Space for Rough Work

31. A shopkeeper marks his goods at such a price that after allowing a discount of 12.5% for cash payment, he still makes a profit of 10%. Find the marked price of an article which costs him Rs 245.

- (a) 306 (b) 307
(c) 308 (d) 309

32. If $\left(x^3 - \frac{1}{x^3}\right) = 14$, the value of $\left(x - \frac{1}{x}\right)$ is-

- (a) 5 (b) 4 (c) 3 (d) 2

33. A part of a line with two end points is called a

- (a) line-segment (b) segment
(c) point segment (d) None of these

34. Factorize : $a^2 + b^2 - x^2 + 2ab - 6x - 9$

- (a) $(a + b + x - 3)(a + b - x + 3)$
(b) $(a - b - x - 3)(a + b + x - 3)$
(c) $(a + b + x + 3)(a - b - x - 3)$
(d) $(a + b + x + 3)(a + b - x - 3)$

35. In a quadrilateral the angles are in the ratio 3 : 4 : 5 : 6. Then the difference between the greatest and the smallest angle is

- (a) 108° (b) 60°
(c) 180° (d) 360°

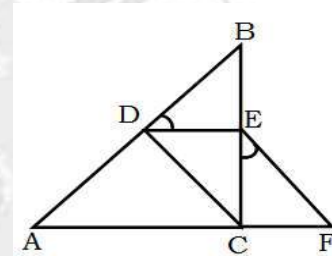
36. The value of $\left(\sqrt[6]{27} - \sqrt{6\frac{3}{4}}\right)^2$

- (a) $\frac{\sqrt{3}}{2}$ (b) $\frac{3}{2}$
(c) $\frac{\sqrt{3}}{4}$ (d) $\frac{3}{4}$

37. The percentage increase in the area of triangle, if each side is quadrupled is

- (a) 1500% (b) 1200%
(c) 200% (d) 800%

38. If $\angle ACB$ is right angle and $AC = CD$ and $CDEF$ is a parallelogram. If $\angle FEC = 10^\circ$, then $\angle BDE$ equals.



- (a) 60° (b) 70°
(c) 50° (d) 55°

39. Longest diagonal of a cube of an edge having length 'a' is

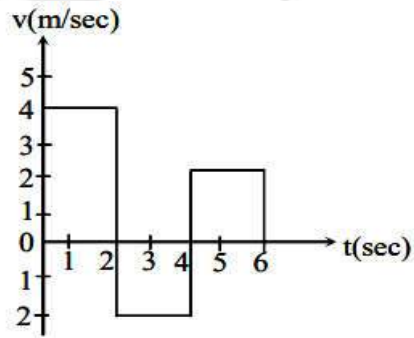
- (a) $6a^2$ (b) $3a^2$ (c) $\sqrt{3}a$ (d) $4a$

40. The numbers 3, 5, 7 and 9 have their respective frequencies $x - 2$, $x + 2$, $x - 3$ and $x + 3$. If the arithmetic mean is 6.5 then the value of x is

- (a) 3 (b) 4 (c) 5 (d) 6

Space for Rough Work

PART - III : PHYSICS & CHEMISTRY

- The basement pillars of a multi storey building are made wide enough to
 - Increase the pressure of building on pillars
 - Decrease the thrust of building on pillars
 - Increase the force of building on pillars
 - Decrease the pressure of building on pillars
- The two ends of a train moving with a constant acceleration pass a certain point with velocities u and v . The velocity with which the middle point of train passes the same point is
 - $\frac{u+v}{2}$
 - $\frac{u^2+v^2}{2}$
 - $\sqrt{\left(\frac{u^2+v^2}{2}\right)}$
 - $\sqrt{u^2+v^2}$
- A car moving at a speed ' v ' is stopped by a retarding force F in distance ' s '. If the speed of the car were ' $3v$ ', then the force needed to stop it within the same distance ' s ' would be
 - $3F$
 - $6F$
 - $9F$
 - $21F$
- A ball is thrown upward with a velocity v . It attains a height of 50 m and comes back to the thrower. Which of the following statement is CORRECT?
 - The total distance covered is zero.
 - The total distance covered is 50 m.
 - The displacement is 100 m.
 - The total time taken is $2\sqrt{10}$ s.
- With what speed should a body be thrown upwards so that the distance travelled in the 5th second and 6th second are equal? (take acceleration due to gravity 10 m/s^2)
 - $\sqrt{100} \text{ m/s}$
 - 50 m/s
 - 100 m/s
 - Not possible for any value of speed.
- An iron ball is weighed in air and then in water by a spring balance. Where does it weigh more?
 - Its weight in air is more than in water.
 - Its weight in water is more than that in air.
 - Its weight is the same both in air and water.
 - Its weight is zero in water.
- Uniform circular motion is an example of :
 - Constant acceleration
 - Variable acceleration
 - A and B both
 - None of these
- The velocity-time graph of a body moving in a straight line is shown in figure. The displacement and distance travelled by the body in 6 seconds are respectively-
 
 - 8m, 16m
 - 16m, 8m
 - 16m, 16m
 - 8m, 8m

Space for Rough Work

9. A number of discs, each of momentum M kg m/s are striking a wall at the rate of n discs per minute. The force associated with these discs, in newton, would be
- (a) $\frac{Mn}{60}$ (b) $60 mn$
(c) $\frac{M}{60n}$ (d) $\frac{n}{60M}$
10. The force acting on a ball due to earth has a magnitude F_b and that acting on the earth due to the ball has a magnitude F_e . Then :
- (a) $F_b = F_e$ (b) $F_b > F_e$
(c) $F_b < F_e$ (d) $F_e = 0$
11. Hold a stone at the end of a spring balance. The pointer shows 5 kg wt. Now release the spring balance. Then the pointer will read
- (a) more than 5 kg wt (b) less than 5 kg wt
(c) equal to 5 kg wt (d) zero
12. The force of gravitation between two bodies can be zero if the separation between the bodies becomes
- (a) 1 (b) 0
(c) 5 (d) infinite
13. If two masses A and B have their volume in the ratio 1 : 4 and their masses are equal, then the densities are in the ratio
- (a) 1 : 4 (b) 4 : 1
(c) 2 : 1 (d) 3 : 1
14. Work done -
- (a) is always positive
(b) is always negative
(c) can be positive, negative or zero
(d) none of these
15. Gravitation is a ___(i)___ force, the effect of gravitation can't be observed unless ___(ii)___ masses are involved.
The force of gravity ___(iii)___ with altitude and ___(iv)___ as we go into the surface of earth.
- (i) (ii) (iii) (iv)
(a) strong large decreases decreases
(b) strong large decreases increases
(c) weak large increases increases
(d) weak large decreases decreases
16. A gas can be best liquefied
- (a) by increasing the temperature
(b) by lowering the pressure
(c) by increasing the pressure and reducing the temperature
(d) none of these is correct.
17. The correct order of evaporation of water, alcohol, petrol and kerosene is :
- (a) water > alcohol > kerosene > petrol
(b) alcohol > petrol > water > kerosene
(c) petrol > alcohol > water > kerosene
(d) petrol > alcohol > kerosene > water.
18. Based on the statements given here choose the correct answer.
- P. Some sugar can be added to a full glass of water without causing overflow.
Q. A liquid is continuous even-though space is present between the molecules.
- (a) P and Q are true and Q explains P
(b) P and Q are true but Q does not explain P
(c) Only P is true
(d) Only Q is true

Space for Rough Work

19. Which one of the following statements will result in the formation of a mixture?
- I. Crushing marble tile into small particles.
II. Breaking ice cubes into small pieces.
III. Adding sodium metal to water.
IV. Adding milk in water.
- (a) I, II and III (b) I, II and IV
(c) III and IV (d) Only IV
20. Which of the following is not a compound?
- (a) Sugar (b) Common salt
(c) Diamond (d) Plaster of Paris
21. Which of the following statement(s) is/are true?
- (a) The symbol of Tungsten is W.
(b) The symbol of Lead is P.
(c) The symbol of Gold is Ag.
(d) The symbol of Thorium is Ti.
22. The maximum number of electrons in N shell is-
- (a) 2 (b) 8
(c) 18 (d) 32
23. Valency of sulphur in SO_2 and SO_3 is ____ and ____ respectively.
- (a) 3, 6 (b) 2, 3
(c) 2, 6 (d) 4, 6
24. The mass of a proton is :
- (a) $1.6 \times 10^{-9}\text{g}$ (b) $1.6 \times 10^{24}\text{g}$
(c) $1.6 \times 10^{-23}\text{g}$ (d) $1.6 \times 10^{-24}\text{g}$
25. Which of the following is not a mineral of iron?
- (a) Magnetite (b) Siderite
(c) Bauxite (d) Limonite
26. Isotopes has
- (a) Same neutron number
(b) same mass number
(c) same atomic number
(d) All of these above
27. Discoverer of Neutron particle
- (a) JJ Thomson (b) James Chadwick
(c) Rutherford (d) Neil Bohr
28. LPG is mainly a mixture of two hydrocarbons:
- (a) butane + ethane
(b) butane + propane
(c) propane
(d) methane + ethane
29. Fire is extinguished by:
- (a) removing all combustible substance
(b) cutting off supply of air
(c) cooling the burning substance
(d) all of these
30. The metallic cylinder in soda-acid extinguisher contains:
- (a) NaOH (b) NaHCO_3
(c) Al(OH)_3 (d) KOH

Space for Rough Work

PART - IV : BIOLOGY

1. Which organelle is responsible for storing genetic information in a eukaryotic cell?
(a) Nucleus (b) Mitochondria
(c) Ribosome (d) Vacuole
2. What is the main function of the cell membrane?
(a) Energy production
(b) Protein synthesis
(c) Control of substances entering and leaving the cell
(d) Photosynthesis
3. Which type of tissue connects bones to muscles in the human body?
(a) Epithelial tissue (b) Nervous tissue
(c) Connective tissue (d) Muscular tissue
4. What is the primary function of epithelial tissue in animals?
(a) Support and protection
(b) Contraction and movement
(c) Sensory reception
(d) Covering and lining surfaces
5. What is the primary purpose of reproduction in organisms?
(a) To maintain the size of the population
(b) To produce offspring with genetic variations
(c) To increase competition for resources
(d) To reduce the lifespan of individuals
6. What type of reproduction involves the formation of spores that develop into new individuals?
(a) Asexual reproduction
(b) Binary fission
(c) Vegetative propagation
(d) Sexual reproduction
7. Which of the following is an essential nutrient required for plant growth?
(a) Nitrogen (b) Oxygen
(c) Water (d) Carbon dioxide
8. Which agricultural practice involves the removal of unwanted plants from a cultivated area?
(a) Irrigation (b) Plowing
(c) Weeding (d) Harvesting
9. Which hormone is responsible for the development of secondary sexual characteristics in boys during adolescence?
(a) Estrogen (b) Progesterone
(c) Testosterone (d) Insulin
10. What is the approximate age range for the onset of puberty in humans?
(a) 5-8 years (b) 13-19 years
(c) 30-40 years (d) 60-70 years
11. Which microorganism is used in the production of antibiotics?
(a) Bacteria (b) Virus
(c) Protist (d) Protozoa
12. What is the role of yeast in the process of fermentation?
(a) Producing oxygen
(b) Producing alcohol and carbon dioxide
(c) Breaking down organic matter
(d) Fixing nitrogen
13. Which microorganism is responsible for causing tuberculosis (TB) in humans?
(a) E. coli
(b) Mycobacterium tuberculosis
(c) Influenza virus
(d) Plasmodium
14. In plants, which type of tissue is responsible for the transport of water and nutrients?
(a) Dermal tissue
(b) Meristematic tissue
(c) Vascular tissue
(d) Ground tissue
15. What is the main advantage of sexual reproduction over asexual reproduction?
(a) Faster reproduction
(b) Production of genetically identical offspring
(c) Adaptation to changing environments
(d) Increased energy efficiency

Space for Rough Work