

# PHYSICS

- A cricket ball of mass 0.5 kg strikes a bat normally with a velocity of  $30 \text{ ms}^{-1}$  and rebounds with a velocity of  $20 \text{ ms}^{-1}$  in the opposite direction. The impulse of the force exerted by the ball on the bat is
  - 0.5 Ns
  - 1.0 Ns
  - 25 Ns
  - 50 Ns
- A body of mass 2 kg moves with an acceleration of  $20 \text{ ms}^{-2}$ . The rate of change of momentum in SI units is
  - $40 \text{ kg ms}^{-2}$
  - $10 \text{ kg ms}^{-2}$
  - $20 \text{ kg ms}^{-2}$
  - $1 \text{ kg ms}^{-2}$
- If a body weighing 40 kg is taken inside the earth to a depth to  $\frac{1}{4}$  th radius of the earth, the weight of the body at that point is
  - 40 N
  - 10 N
  - 300 N
  - zero
- A body of mass  $m$  is taken from earth's surface to a height equal to radius of earth. The change in potential energy will be
  - $mgR$
  - $\frac{1}{2} mgR$
  - $2mgR$
  - $\frac{1}{4} mgR$
- Two spheres of masses 100 kg and 200 kg are separated by a distance of 50 cm. Find the force of attraction between them ( $G = 6.6 \times 10^{-11} \text{ Nm}^{-2} \text{ kg}^{-2}$ ).
  - $52.8 \times 10^{-7} \text{ N}$
  - $58.2 \times 10^{-7} \text{ N}$
  - $22.4 \times 10^{-7} \text{ N}$
  - $8.4 \times 10^{-7} \text{ N}$
- According to the third law of motion, action and reaction
  - always act on the same body
  - always act on different bodies in opposite directions
  - have same magnitude and direction
  - act on either body at normal to each other
- The gravitational force between two objects is  $F$ . If the masses of both objects are halved without changing distance between them, then the gravitational force would become
  - $\frac{F}{4}$
  - $\frac{F}{2}$
  - $F$
  - $2F$
- The numerical ratio of displacement to distance covered by a moving object is
  - always less than 1
  - always equal to 1
  - always more than 1
  - equal or less than 1
- Velocity versus time graph of a ball of mass 50 g rolling on a concrete floor is shown below. Calculate the acceleration and the frictional force of the floor on the ball?
 
  - $10 \text{ ms}^{-2}$ , 0.5 N
  - $20 \text{ ms}^{-2}$ , 1.5 N
  - $30 \text{ ms}^{-2}$ , 2.5 N
  - $40 \text{ ms}^{-2}$ , 3.5 N
- If the velocity of a ball is tripled, what will be the ratio of its initial kinetic energy and final kinetic energy?
  - 2 : 7
  - 1 : 9
  - 2 : 9
  - 7 : 9

11. Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it. How much work the men do in lifting the box?
- (1) 4500 J
  - (2) 3500 J
  - (3) 2500 J
  - (4) 1500 J
12. If speed of sound in air is  $340 \text{ ms}^{-1}$ , calculate wavelength when frequency is 256 Hz.
- (1) 3.33 m
  - (2) 2.33 m
  - (3) 4.33 m
  - (4) 1.33 m
13. A motorcyclist drives from point A to point B with a uniform speed of  $30 \text{ km h}^{-1}$  and returns back to point A with a uniform speed of  $20 \text{ km h}^{-1}$ . Find the average speed of the motorcyclist.
- (1) 24 km/hr
  - (2) 34 km/hr
  - (3) 26 km/hr
  - (4) 36 km/hr
14. The time of ascent when measured from the point of projection of a body projected upwards, the
- (1) Time of ascent > Time of descent
  - (2) Time of ascent = Time of descent
  - (3) Time of ascent < Time of descent
  - (4) All of these
15. A man is in a car is moving with a velocity of  $36 \text{ km/hr}$ . His speed with respect to the car is
- (1) 10 m/s
  - (2) 36 m/s
  - (3) zero
  - (4) infinite

## CHEMISTRY

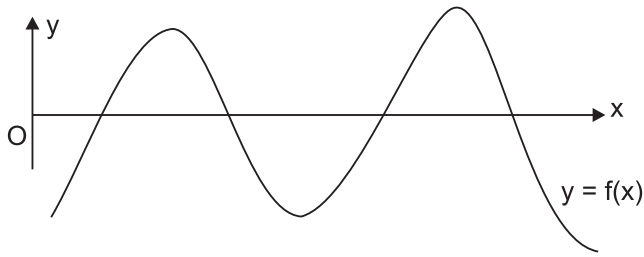
16. In the chemical reaction  $\text{C}_8\text{H}_{18} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ , the coefficient of  $\text{CO}_2$  in the balanced equation is
- (1) 16
  - (2) 28
  - (3) 18
  - (4) 25
17. Which among the following is not a limitation of Bohr's atomic model?
- (1) Bohr couldn't explain Zeeman effect.
  - (2) Bohr couldn't justify quantization of angular momentum.
  - (3) Bohr couldn't explain Hydrogen spectrum.
  - (4) Bohr couldn't explain concept of orbitals.
18. Orbit with lowest energy among the following is
- |       |       |
|-------|-------|
| (1) K | (2) L |
| (3) M | (4) N |
19. The maximum no. of electrons that can be accommodated in the third shell of an atom are
- (1) 32
  - (2) 36
  - (3) 18
  - (4) 8
20. Elliptical orbits were proposed by
- (1) Neil's Bohr
  - (2) Rutherford
  - (3) Sommerfeld
  - (4) Max Plank

21. The no. of neutrons in  $O^{2-}$  ion (atomic mass of O is 16) are  
 (1) 16 (2) 8  
 (3) 10 (4) 2
22. Number of free surfaces a gas exhibit are  
 (1) 1 (2) 5  
 (3) Zero (4) Any number
23. One of the following is neither an element nor a compound. Pick it out.  
 (1) Bronze (2) Mercury  
 (3) HCl (4) Table salt
24. Gun powder consists of  
 (1) Sulphur (2) Charcoal  
 (3) Nitre (4) All the above
25. A heterogeneous mixture is stable. Its particles can't pass through filter paper. It shows Tyndall effect. The mixture is  
 (1) a colloid  
 (2) a suspension  
 (3) a true solution  
 (4) an alloy
26. Pure copper sulphate can be obtained from its solution by  
 (1) Distillation  
 (2) Evaporation  
 (3) Crystallization  
 (4) Sublimation
27. The percentage of impurity in 18 carat gold is  
 (1) 75% (2) 25%  
 (3) 18% (4) 4%
28. Seema visited a Natural Gas Compressing Unit and found that the gas can be liquefied under specific conditions of temperature and pressure. While sharing her experience with friends she got confused. Help her to identify the correct set of conditions.  
 (1) Low temperature, low pressure  
 (2) High temperature, low pressure  
 (3) Low temperature, high pressure  
 (4) High temperature, high pressure
29. Which one of the following has maximum number of atoms?  
 (1) 18 g of  $H_2O$  (2) 18 g of  $O_2$   
 (3) 18 g of  $CO_2$  (4) 18 g of  $CH_4$
30. Write the molecular formula for the Calcium (II) Phosphate.  
 (1)  $Ca_2(PO_3)_4$   
 (2)  $Ca_3(PO_4)_2$   
 (3)  $Ca_3(PO_3)_4$   
 (4)  $Ca_2(PO_2)_4$

## MATHEMATICS

31. If both 121 and 27 are the factors of the number  $2^8 \times 3^2 \times 13^{11} \times n$ , then the smallest such  $n$  is  
 (1) 66 (2) 363  
 (3) 242 (4) 81
32. Area of the triangle formed by points (0,2), (2, 0) and (0, 0) equals  
 (1) 2 sq. units (2) 4 sq. units  
 (3) 8 sq. units (4) 10 sq. units
33. The relation between  $x$  and  $y$  such that the points  $P(x, y)$  is equidistant from the points  $A(7, 1)$  and  $(3, 5)$  is  
 (1)  $x + y = 3$  (2)  $x - y = 4$   
 (3)  $x - 2y = 1$  (4)  $x - y = 2$

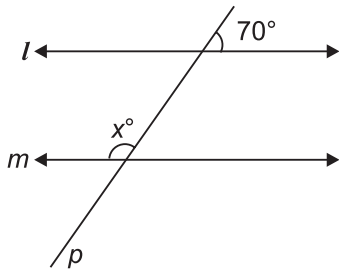
34.



In the figure above how many roots does  $f(x) = 0$  have

- (1) 4
- (2) 2
- (3) 3
- (4) 6

35.  $l$  and  $m$  are  $\parallel$  lines in the figure,  $p$  is the transversal. Value of  $x^\circ$  is

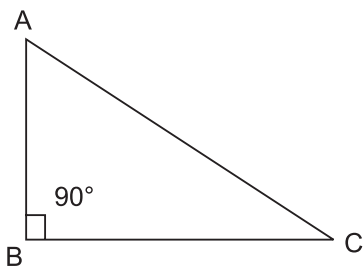


- (1)  $70^\circ$
- (2)  $110^\circ$
- (3)  $180^\circ$
- (4)  $20^\circ$

36. Zero's of  $2x^2 + 7x + 6$  are

- (1) 2, 4
- (2)  $-2, -3/2$
- (3) 3, 4
- (4) 5, 6

37. In the figure, the orthocentre of the  $\Delta ABC$  is



- (1) A
- (2) C
- (3) B
- (4) both A and B

38. In a circle length of the longest chord is 14 cm then its radius (in cm) equals

- (1) 4
- (2) 2
- (3) 8
- (4) 7

39. A floral design on the floor of a building consists of 280 tiles, each tile is in the shape of a parallelogram of altitude 3 cm and base 5 cm. The cost of polishing the design at the rate of 50 paise per  $\text{cm}^2$ .

- (1) ₹ 2105
- (2) ₹ 2100
- (3) ₹ 2108
- (4) ₹ 2107

40. There are 2 concentric circles of radii 13 cm and 12 cm. Then the length of the chord of the outer circle which touches the inner circle is

- (1) 10 cm
- (2) 13 cm
- (3) 12 cm
- (4) 12.5 cm

41. If  $x, y$  are real numbers such that  $3^{(x/y+1)} - 3^{(x/y-1)} = 24$ , then find the value of  $(x+y)/(x-y)$ .

- (1) 2
- (2) 3
- (3) 4
- (4) 5

42. The abscissa and ordinate of a point are  $-3$  and  $-5$  respectively then write down the ordered pair.
- (1)  $P(3, 5)$                       (2)  $P(-3, -5)$   
 (3)  $P(-3, 5)$                       (4)  $P(3, -5)$
43. An angle is  $14^\circ$  more than its complement. Find the angle.
- (1)  $72^\circ$   
 (2)  $62^\circ$   
 (3)  $52^\circ$   
 (4)  $42^\circ$
44. Diagonals of a quadrilateral ABCD bisect each other. If  $\angle A = 45^\circ$ , determine  $\angle B$ .
- (1)  $135^\circ$                               (2)  $145^\circ$   
 (3)  $155^\circ$                               (4)  $165^\circ$
45. Three unbiased coins are tossed. What is the probability of getting at least 2 tails?
- (1)  $1/3$   
 (2)  $1/6$   
 (3)  $1/2$   
 (4)  $1/8$

## BIOLOGY

46. Which type of tissue has lignified cell walls?
- (1) Parenchyma  
 (2) Collenchyma  
 (3) Sclerenchyma  
 (4) Cambium
47. An exotic breed of poultry is
- (1) Peela  
 (2) White leghorn  
 (3) Kajal  
 (4) Nurie
48. Which of the following is not a simple tissue?
- (1) Xylem  
 (2) Parenchyma  
 (3) Collenchyma  
 (4) Sclerenchyma
49. Choose the complex fertilizer.
- (1) Potassium sulphate  
 (2) Calcium ammonium nitrate  
 (3) Triple super phosphate  
 (4) Urea ammonium phosphate
50. The \_\_\_\_\_ makes urea and breaks down old red blood cells.
- (1) Pancreas  
 (2) Kidneys  
 (3) Urethra  
 (4) Liver
51. L.S.(D) is
- (1) hallucinogenic  
 (2) sedative  
 (3) stimulant  
 (4) tranquilliser.
52. In which group of animals coelom is filled with blood?
- (1) Arthropoda  
 (2) Annelida  
 (3) Nematoda  
 (4) Echinodermata
53. Which cells do not have perforated cell walls?
- (1) Tracheids  
 (2) Companion cells  
 (3) Sieve tubes  
 (4) Vessels

54. Find out the correct sentence:

- (i) Hybridisation means crossing between genetically dissimilar plants.
- (ii) Cross between two varieties is called as inter-specific hybridisation.
- (iii) Introducing genes of desired character into a plant gives genetically modified crop.
- (iv) Cross between plants of two species is called as intervarietal.

- (1) (i) and (iii)
- (2) (ii) and (iv)
- (3) (ii) and (iii)
- (4) (iii) and (iv)

55. Organisms without nucleus and cell organelles belong to

- (1) fungi
- (2) protista
- (3) algae
- (4) bacteria

56. A permanent slide shows thin walled isodiametric cells with a large vacuole. The slide is

- (1) collenchyma
- (2) parenchyma
- (3) sclerenchyma
- (4) meristematic tissue

57. Digestive bags or suicide bags of cell are

- (1) Peroxisomes
- (2) Ribosomes
- (3) Lysosomes
- (4) Chloroplasts

58. Which of the following is method for fixing nitrogen?

- (1) Lightning
- (2) Plants take in nitrogen through their leaves.
- (3) Nitrogen dissolves in rainwater.
- (4) All of these

59. Golden fibre refers to

- (1) Hemp
- (2) Cotton
- (3) Jute
- (4) Nylon

60. State the phylum to which Antedon (feather star) and Asterias (Starfish) belong.

- (1) Coelenterata
- (2) Annelida
- (3) Echinodermata
- (4) Mollusca



**END OF THE EXAM**