Part – I (Physics)

1. The acceleration (a) of a particle is plotted on the Y- axis while the time (t) elapsed is plotted along the X - axis. What does the a - t graph give?

(A) The distance covered

(B) The difference in velocities

(C) The difference in acceleration

(D) The difference in force

2. When a bus starts suddenly, the passengers are pushed back. This is an example of which of the following?

(A) Newton's first law   (B) Newton's second law (C) Newton's third law   (D) None of Newton's laws

3. What is centre of buoyancy?

(A) The centre of gravity of the displaced liquid

(B) Mass per unit volume

(C) The point where total weight of the body acts

(D) The difference in weights of body in air and liquid

4. When can the magnitude of displacement be equal to the distance covered by a body?

(A)   When the motion of the body is towards the initial position

(B) When the motion of the body is along a straight line

(C) When the motion of the body is along a curved path

CD) When the body moves with a uniform speed along a circular path

5. Identify the longitudinal waves from the following.

(A) Lightwaves   (B) Radio waves   (C) Ultrasonic waves   (D) Surface water waves

6. A body starts from rest and acquires a velocity of 4 m s^{-1} during the displacement of magnitude 16 m. What is its acceleration?

(A) 4ms^{-2} (B) 2ms-^{2} (C) 0 m s^{-2} (D) 0.5 m s^{-2}

Space for Rough Work

7. A body moves with constant retardation along a straight line. Which of the given physical quantities of the body decrease during its motion?

(i)   Speed   (ii)   Velocity   (iii) Displacement

(A) Only (i) and (ii)   (B) Only (ii) and (iii)   (C) Only (i) and (iii)   (D) (i), (ii) and (iii)

8. What is the impact of balanced forces on an initially stationary object? •>'

(A) The object remains at rest   (B) The object moves with uniform speed

(C) The object moves in the direction of frictional force acting on it

(D) The object moves in a direction perpendicular to the surface of contact

9. A box of mass 2 kg is lifted diagonally from point A to point B as shown in the given figure. Given that the acceleration due to gravity is 10 m s^{-2}, what is the gravitational potential energy gained by the box?
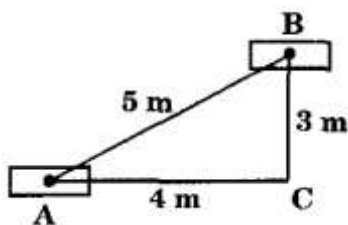
(A) 20 J   (B) 60J   (C) 80J   (D) 100J

10. Which of the following is the common characteristic of all moving bodies?

(A) They do not change their position with time.   (B) They change their position with time.

(C) They always travel with uniform speed.   (D) Equations of motion have to be applied to them.

11. Which of the following units is used to measure thrust?
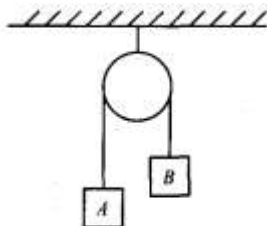
(A) Dyne   (B) Pascal   (C) Newton per meter square   (D) Dyne per centimeter

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Space for Rough Work

Passage (Question No. 12 to 14)

Two blocks A and B of mass 2 kg and 3 kg respectively are connected with the help of a massless, inextensible string passing over a smooth pulley as shown, The system is released from rest at t = 0, then: (take g = 10 ms^{-2})

12. Acceleration of blocks is

(a) 5 ms^{-2}

(b) 2 ms^{-2}

(c) 20/3 ms^{-2}

(d) 6 ms^{-2}

13. If at t = 1 s, block B is stopped momentarily and released, after how much time will the string become tight again?

(a) 0.2s

(b) 0.4s

(c) 0.5s

(d) 1s

14. What will be the velocity of the blocks, just after the string becomes taut?

(a) 0.2 ms^{-1}

(b) 0.4 ms^{-1}

(c) 1 ms^{-1}

(d) 2 ms^{-1}

Part – II (Chemistry)

15. Which element has neither a definite shape nor a definite volume at 40 °C ?

(A) Silver

(B) Gallium

(C) Mercury

(D) Hydrogen

16. A student was asked to mix the white of an egg with water and stir well. What did he observe?

(A) A transparent solution is formed

(B) A translucent solution is formed

(C) Egg white floats on the surface of the water

(D) Egg white settles down at the bottom

Space for Rough Work

17. What is the ratio of the number of neutrons present in potassium atom and magnesium atom with mass numbers 39 and 24 respectively?

(A) 19 : 12   (B) 5 : 3   (C) 5 : 6   (D) 4 : 3

18. Study the information given.

♦ It appears to be homogenous but actually it is heterogeneous

♦ It can scatter a beam of light passing through it.

♦ Its particles cannot be separated by filtration

About which one of the following is discussed in the given box?

(A) Solution   (B) Suspension   (C) Element   (D) Colloid

19. Identify the element from among the following.

(A) Fog   (B) Methane   (C) Tin   (D) Soil

20. The particles of *X* are observed to undergo Brownian motion. What kind of substance is *X' ?

(A) Aqueous solution   (B) True solution   (C) Suspension   (D) Colloidal solution

Part – III (Biology)

21. Which of the following fungus extraction is used as an antibiotic?

(A) Aspergillus   (B) Penicillium   (C) Agaricus   (D) Bread Mould

22. The following is an unlabelled out line diagram of an organism.

Which of the following control measures would not help prevent the spread of malaria?

(A) Covering windows with netting.   (B) Drinking boiled water.

(C) Keeping surroundings dry and clean.   (D) Spraying insecticides on stagnant water.

Space for Rough Work

The practice of growing different crops on the same piece of land in a pre-planned succession is called crop rotation. If same crop is grown in a piece of land year after year, it reduces the fertility of the soil. Moreover, the disease causing pathogens get their hosts every year and so they multiply and increase in number. This can be avoided by growing different crops in a pre-planned succession. During crop rotation, leguminous crops are also grown in rotation with non-leguminous crops. Leguminous plants are provided roots. The root nodules contain nitrogen fixing bacteria (Rhizobium), which have the ability to fix up atmospheric nitrogen into nitrates and in turn enrich the soil.

23. The practice of growing different crops on the same piece of land in a preplanned succession is called

(a) crop modification   (b) crop rotation   (c) sustainable agriculture   (d) mixed cropping

24. The root nodules of leguminous plants contain

(a) fungi   (b) nitrogen fixing bacteria   (c) algae   (d) nematodes

25. If same crop is grown in a piece of land year after year, it

(a) reduces the fertility of the soil   (b) increases the fertility of the soil

(c) does not affect the fertility of the soil   (d) none of the above

Part – IV (Mathematics)

26. Three squares are joined at their corners and strung between two vertical poles as shown.
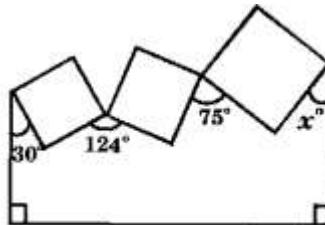
Find the value of x°.

(A) 36°   (B) 30°   (C) 41°   (D) 52°

Space for Rough Work

27. How many spherical lead shots, each of radius 1 cm can be made from a sphere of radius 4 cm?

(A) 32   (B) 16   (C) 64   (D) 48

28. If an angle of a parallelogram is four-fifths of its adjacent angle, what are the angles of the parallelogram?

(A) 60°, 120°, 60°, 120°   (B) 90°, 90°,90°,90°   (C) 80°, 100°,80°,100°   (D) 30°, 150°, 30°, 150°
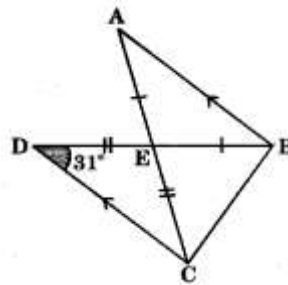
29. What is the quadrilateral that is formed by joining the points (1,1); (2,4); (8, 4) and (10,1)?

(A) A triangle   (B) A square   (C) A rectangle   (D) A trapezium

30. The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3. Find its diameter.

(A) 7m   (B) 13m   (C) 14m   (D) 15m

31. In the given figure, AB // DC. $\triangle$ EDC and $\triangle$ EBA are both isosceles triangles and $\angle$ EDC = 31°. Identify the measure of $\angle$ AED.

(A) 118°   (B) 62°   (C) 57°   (D) 89°

32. What is the sum of the two values of *x* which satisfy $(x-13)^2 = 2013^2$

(A) 4026   (B) 0   (C) -2000   (D) 26

Space for Rough Work

33. If $x^2 + 2x = 45$, what is the value of $x^4+4x^3+4x^2-13$?

(A) 2013   (B) 1986   (C) 2012   (D) 32

34. Which of the following is the equation of a straight line passing through the points (2, -2), (0, 0) and (-3, 3) ?
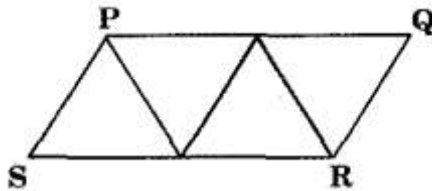
(A) x-y = 0   (B) x + y = 0   (C) 2x-y = 0   (D) 2x + 2y = 4

35. The parallelogram PQRS is formed by joining together four equilateral triangles of side 1 unit, as shown in the figure.

What is the length of the diagonal SQ?

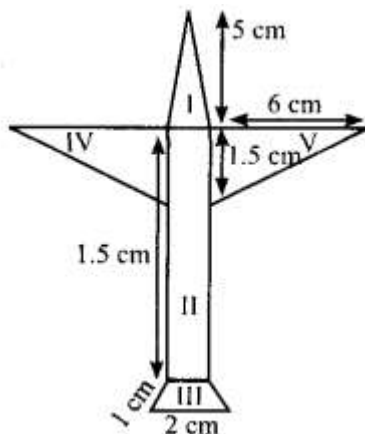(A) $\sqrt{7}$ units   (B) $\sqrt{8}$ units   (C) $\sqrt{6}$ units   (D) $\sqrt{5}$ units

Space for Rough Work

Neev made a picture of an aeroplane with coloured paper as shown in figure. Find the total area of the paper used.

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.

36. Area of region 1 is

(a)   2..5 cm^2

(b) 2 cm^2

(c) 5 cm^2

(d) 3 cm^2

37. Area of region II is

(a)   6 cm^2

(b) 5cm^2

(c)   6.5 cm^2

(d) 7cm^2

38. Area of region III is

(a)   1 cm^2

(b) 3cm^2

(c)   2 cm^2

(d) 1.3cm^2

39. When two dice are thrown , the probability of getting a numbers always greater than 4 on the second dice is

(a)   1/6

(b) 1/3

(c)   1/36

(d) None of these

Space for Rough Work

40. The median of the following data 46,64,87,41,58,77,35,90,55,33,92 is

(a)   87
(b) 77
(c)   58
(d) 60.2

41. Which of the following statement is true

(a) The diagonals of a rectangle are perpendicular
(b) The diagonals of a rhombus are equal

(c) Every square is s rhombus
(d) None of these

42. The number of tangents that can be drawn to a circle at a given point on its is

(a)   two
(b) one
(c)   zero
(d) three

43. The two irrational numbers between $\sqrt{2}$ and $\sqrt{3}$ are

(a) $2^{½}, 6^{¼}$
(b) $3^{¼}, 3^{1/6}$
(c) $6^{1/8}, 3^{¼}$
(d) None

44. The point (3,2) is at a distance of ……………..units from Y - axis.

(a) 2 units
(b) 3 units
(c)   5 units
(d) none

45. The point (-2,-3) belongs to quadrant

(a) Q_1
(b) Q_2
(c) Q_3
(d) Q_4

46. If two line are parallel then the perpendicular distance between them remains

(a) decreasing
(b) increasing
(c)   constant
(d) none

47. Instrument used to draw a pair of parallel lines are

(a)   protractor and scale
(b) compass & scale
(c)   set square and scale
(d) none

Space for Rough Work

48. If a quadrilateral ha two adjacent sides equal and the other two sides equal it is called

(a)   parallelogram   (b) square   (c)   rectangle   (d) kite

49. The diameter is

(a) smallest chord of a circle   (b) greatest chord of a circle

(c) three times radius of circle   (d) none of these

50. The number of independent measurements require to construct a triangle is

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

Part – V (Mental Ability Test)

Directions: (Q. 51 to 52) In each of the following questions four options have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

51.

(a) 21   (b) 69   (c) 81   (d) 97

52.

(a) 5788   (b) 5878   (c) 6482   (d) 9748

Directions: In questions 53 to 54, out of the four alternatives, select the one which when substituted for the question mark "?" maintains the same relationship on both sides of the sign "::"

53.   42 : 20 : : 64 : ?

(a) 28   (b)31   (c)35   (d) 39

54. EGIK:FILO: : FHJL : ?

(a) ADJC   (b) JGMP   (c) GJMP   (d) MPJD

Space for Rough Work

55. PALE: LEAP:: POSH:?

(a) SHOP   (b) HOPE   (c) POLE   (d) LATE

56 .A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

If the English alphabet is written in reverse order, which one of the following letter will be the 14th letter from the left?

(a) L   (b) M   (c) N   (d) P

57. In the following number series, how many such even numbers are there which are followed by an odd number and preceded by any even number ?
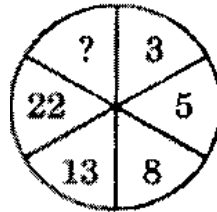
<div align="center">86768932753422355228119</div>

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

58. Peter's no. is 21st in a class of 65 students. If we starts counting from downwards then what will be Peter's no.?

(a) 44th (b) 45th (c) 46th (d) 47th

59. Find the missing character in the following:

(a) 39   (b)41   (c) 43   (d) 47

60. What comes next?

CANASTA

ACTRESS

SAUSAGE

ESCAPED

Is it

(a) pagodas   (b) develop   (c) angular   (d) doublet

Space for Rough Work