

01 If $x^4 + \frac{1}{x^4} = 727$, then what is $\left(x - \frac{1}{x}\right)^2$?

- (A) 3 (B) 4
(C) 5 (D) 6

02 Select the equivalent of $\frac{1}{(x^2 - 3x - 28)} - \frac{1}{(2x^2 - 17x + 21)}$.

- (A) $\frac{1}{(2x^2 - 5x - 12)}$ (B) $\frac{1}{(2x^2 - 5x - 16)}$
(C) $\frac{1}{(x^2 - 3x - 12)}$ (D) $\frac{1}{(2x^2 + 5x - 12)}$

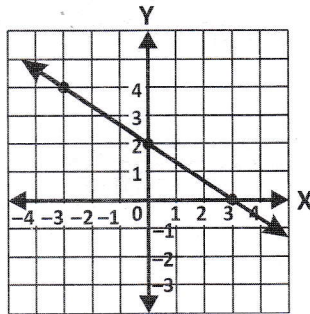
03 Which of the following figures is obtained by joining mid-points of adjacent sides of a rectangle of sides 8 cm and 6 cm ?

- (A) A rectangle of area 24 cm².
(B) A square of area 25 cm².
(C) A trapezium of area 24 cm².
(D) A rhombus of area 24 cm².

04 What is the value of $\frac{(67.542)^2 - (32.458)^2}{75.458 - 40.374}$?

- (A) 1 (B) 10
(C) 100 (D) 1000

- 05 Which of the following equations represents the given graph ?



- (A) $2x + y = 6$ (B) $y + 2x + 4 = 0$
 (C) $2(x - 1) + 3y = 4$ (D) $2x - 3y = 6$
- 06 If $y = 3^x$ and 'x' and 'y' are both integers, which of the following is equivalent to $3^{2x} + 3^x \times 3$?

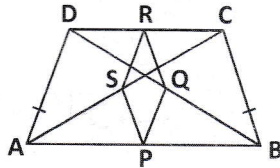
- (A) $y(y + 3)$ (B) $y^2 + 3$
 (C) $3y + 3$ (D) $3(y + 3)$

- 07 The height of sand in a cylindrical box drops 3 inches when 1 cubic foot of sand is poured out. What is the diameter, in inches, of the cylinder ?

- (A) $\frac{24}{\sqrt{\pi}}$ (B) $\frac{48}{\sqrt{\pi}}$ (C) $\frac{32}{\sqrt{\pi}}$ (D) $\frac{48}{\pi}$

Space for rough work

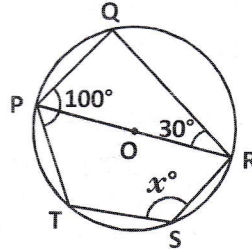
- 08** ABCD is a trapezium in which $AB \parallel DC$ and $AD = BC$. If P, Q, R, S be respectively the mid-points of BA, BD and CD, CA, then what is quadrilateral PQRS ?



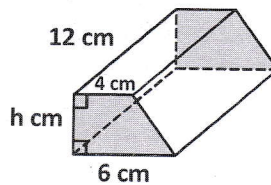
- (A) rhombus (B) rectangle
(C) parallelogram (D) square
- 09** The function $f(x) = 35 + 15x$ represents the amount of money, in Rupees, Mr. Ramesh earns for working x hours. How much money does Mr. Ramesh earn for working 25 hours ?
- (A) ₹ 75 (B) ₹ 375
(C) ₹ 410 (D) ₹ 1250
- 10** The adjacent sides of a parallelogram are 4 cm and 9 cm. What is the ratio of its altitudes ?
- (A) 16 : 81 (B) 9 : 4
(C) 2 : 3 (D) 3 : 2

Space for rough work

- 11** In the given figure, PR is a diameter. Find the value of x .



- (A) 100° (B) 110° (C) 120° (D) 140°
- 12** On plotting the points O (0, 0), A (5, 0), B (5, 3) and C (0, 3) and joining OA, AB, BC and CO, which of the following figures is obtained ?
- (A) Rhombus (B) Square
(C) Trapezium (D) Rectangle
- 13** The cross section of a prism 12 cm long, is a trapezium with the measurements shown. If the volume of the prism is 300 cm^3 , calculate the value of h .



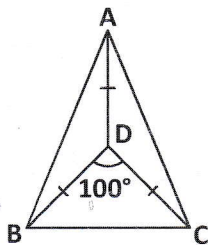
- (A) 5 cm (B) 6 cm
(C) 3 cm (D) 4 cm

Space for rough work

14 An equilateral ΔPQR is inscribed in a circle with centre O .
Find $\angle RQO$.

- (A) 60° (B) 120° (C) 30° (D) 90°

15 Find $\angle BAC$ in the below given figure in which
 $\overline{AD} = \overline{BD} = \overline{CD}$.



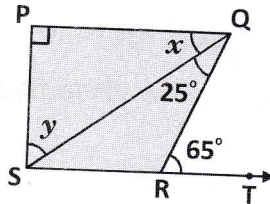
- (A) 60° (B) 50°
(C) 40° (D) cannot find

16 Which of the following statement is true about a median of a triangle ?

- (A) It divides the triangle into two triangles of equal area.
(B) It divides the triangle into two congruent triangles.
(C) It divides the triangle into two right triangles.
(D) It divides the triangle into two isosceles triangles.

Space for rough work

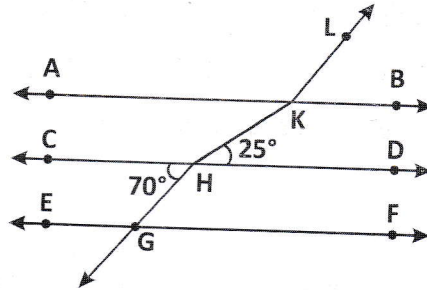
- 17 In the given figure if $PQ \parallel SR$, $\angle SQR = 25^\circ$, $\angle QRT = 65^\circ$, then find y .



- (A) 40° (B) 150°
 (C) 50° (D) 80°
- 18 If $(4 + \sqrt{15})^{3/2} - (4 - \sqrt{15})^{3/2} = k\sqrt{6}$, then find k .
- (A) 9 (B) 8
 (C) 7 (D) 6
- 19 What is the value of $\frac{(2019^2 - 2025)(2019^2 + 4035)(2020)}{(2016)(2018)(2021)(2022)}$?
- (A) 2019 (B) 2020
 (C) 2021 (D) 2022

Space for rough work

- 20** In the figure, $AB \parallel CD \parallel EF$ and $GH \parallel KL$. Choose the measure of $\angle HKL$.



- (A) 85° (B) 135° (C) 145° (D) 155°
- 21** Select the fourth root of $[193 - 4\sqrt{2178}]$.
- (A) $(7 - \sqrt{2})$ (B) $(5 - \sqrt{2})$
 (C) $(3 - \sqrt{2})$ (D) $(10 - \sqrt{7})$
- 22** The sum and difference of two angles of a triangle are 128° and 22° respectively. Find the biggest angle of the triangle.
- (A) 52° (B) 53°
 (C) 75° (D) 83°

Space for rough work

- 23** The perimeter of a triangles is 540 m and its sides are in the ratio 25 : 17 : 12. Find its area.
- (A) 12,000 m² (B) 10,000 m²
(C) 9,000 m² (D) 8,000 m²
- 24** If $3^{2x} + 9 = 10 \times 3^x$, then select the value of x .
- (A) 3 (B) -2
(C) 2 (D) -3
- 25** In $\triangle ABC$, $AB = 7.2$ cm, $BC = 4.8$, $AM \perp BC$ and $CL \perp AB$. If $CL = 4$ cm, find the measure of AM .
- (A) 12 cm (B) 8 cm
(C) 4 cm (D) 6 cm

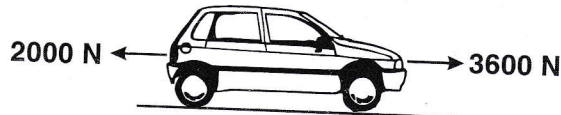
Space for rough work

- 26 The acceleration of free fall on the moon is 1.6 m/s^2 and on the Earth is 10 m/s^2 . A rock has a mass of 10 kg on the Earth.

Which statement about the rock is correct ?

- (A) Its mass on the Moon is 1.6 kg
- (B) Its mass on the Moon is 10 kg
- (C) Its weight on the Moon is zero
- (D) Its weight on the Earth is 10 N

- 27 A car of mass 800 kg is being driven along a level road. The engine supplies a forward force of 3600 N and the total resistive force is 2000 N .



What is the acceleration of the car ?

- (A) 2.0 m/s^2
- (B) 2.5 m/s^2
- (C) 4.5 m/s^2
- (D) 7.0 m/s^2

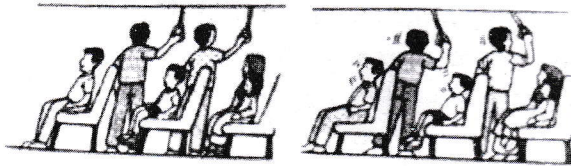
- 28 A girl falls from a tree. What is the change of energy before she hits the floor ?

- (A) Gravitational potential energy \rightarrow kinetic energy
- (B) Gravitational potential energy \rightarrow thermal energy
- (C) Kinetic energy \rightarrow gravitational potential energy
- (D) Chemical potential energy \rightarrow kinetic energy

29 A man drives at a constant speed of 15 m/s from home for 30 minutes. When he reaches the expressway, he drives at a constant speed of 25 m/s for 20 minutes. He then takes an exit and comes to a stop at a traffic light for 2 minutes. Calculate his average speed for his journey.

- (A) 12.7 m/s (B) 15.9 m/s
(C) 18.3 m/s (D) 21.6 m/s

30 A bus accelerates forward from the position of rest. As the bus accelerates, the passengers lean backwards slightly.

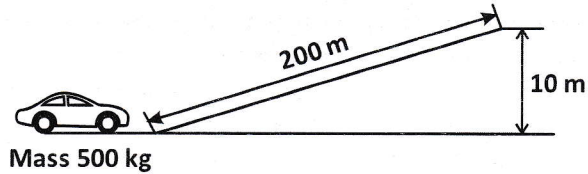


Which of the following is the cause in the given activity ?

- (A) The bus is travelling too fast.
(B) The passengers are leaning in the wrong direction.
(C) The bus exerts a backward force on the passengers.
(D) The passengers lean back due to their initial inertia of rest.

Space for rough work

- 31** The diagram given below shows a small car of mass 500 kg approaching a hill. It moves up the hill with uniform speed.



Ignore friction and take the value of g to be 10 N/kg . How much work is done in moving the car up the hill ?

- (A) $6 \times 10^3 \text{ J}$ (B) $5 \times 10^4 \text{ J}$
 (C) $9 \times 10^5 \text{ J}$ (D) $7 \times 10^6 \text{ J}$
- 32** A body moves in a straight line for 6 km in the east direction, and then turns north and moves 8 km. The total time of journey is 2 h. What can be concluded from the given information ?
- (A) The total displacement of the body is 10 km
 (B) The average speed of the body is 7 km h^{-1}
 (C) The average velocity of the body is 5 km h^{-1}
 (D) All of the above

Space for rough work

33 Given below are the safety measures used in vehicles to reduce the negative effects of inertia on people travelling in various vehicles.

- (I) Cushions are fitted in the car seats' headrests so that the force exerted on the head when the car changes motion suddenly does not cause any injury to the head.
- (II) Heavy vehicles like buses and trucks have restricted speed limits to reduce the inertia.
- (III) All passengers must wear seat belts so that they are not thrown forward if the vehicles stops suddenly.
- (IV) Airbags help cushions the impact and reduce the damage to your body.

Which of the above statements are correct ?

- (A) (i), (ii) and (iv) only
- (B) (ii), (iii), and (iv) only
- (C) (i), (iii) and (iv) only
- (D) All of the above

Space for rough work

34 Which energy conversion takes place when a guitar string is plucked ?

- (A) Potential energy → Kinetic energy + Heat energy
- (B) Potential energy → Kinetic energy + Sound energy
- (C) Kinetic energy → Potential energy + Heat energy + Sound energy
- (D) Chemical energy → Potential energy + Kinetic energy

35 We have two different liquids 1 and 2 whose relative densities are 0.75 and 1.0 respectively. If we dip two solid objects P and Q having relative densities 0.6 and 0.9 in these liquids, then

- (A) Solid object P floats in liquid 1 and Solid object Q sinks in liquid 2
- (B) Solid object P sinks in liquid 1 and Solid object Q floats in liquid 2
- (C) Solid object P floats in liquid 2 and Solid object Q sinks in liquid 1
- (D) Solid object P sinks in liquid 2 and Solid object Q floats in liquid 1

Space for rough work

- 36 Which one is the best example of law of conservation of mass ?
- (A) 12 g of carbon combines with 32 g of oxygen to form 44 g of CO_2
- (B) When 12 g of carbon is heated in a vacuum there is no change in mass
- (C) A sample of air increases in volume when heated at constant pressure but its mass remains unaltered
- (D) The weight of a piece of platinum is the same before and after heating in air

- 37 Read the table given below.

	Melting point /°C	Boiling point /°C	Solubility point /°C
Mercury	-38	357	No
Ethanol	-144	78	Yes

Which one is used to separate a mercury, ethanol mixture ?

- (A) Filter paper (B) Distillation flask
- (C) Separating funnel (D) Centrifuge

Space for rough work

- 38** How many molecules are present in 5.23 g of glucose (molecular weight of glucose is 180) ?
- (A) 1.75×10^{22} molecules
 (B) 17.5×10^{-22} molecules
 (C) 17.5×10^{22} molecules
 (D) 1.75×10^{-22} molecules

- 39** Two chemical substances or reactants X and Y combine together to form a product Z which contains both X and Y.



X and Y cannot be broken down into simpler substances by simple chemical reactions.

- (i) Z is a compound.
 (ii) X and Y are compounds.
 (iii) X and Y are elements.
 (iv) Z has a fixed composition

Which of the above statements on X, Y and Z are correct ?

- (A) (i), (ii) and (iii) only
 (B) (i), (ii) and (iv) only
 (C) (ii), (iii) and (iv) only
 (D) (i), (iii) and (iv) only

Space for rough work

40 50 ml of water is mixed with 50 ml of alcohol. The total volume of the mixture is less than 100 ml. Identify the reason.

- (A) Alcohol does not occupy space.
- (B) Water and alcohol can be mixed together.
- (C) Water and alcohol particles move randomly.
- (D) There are spaces between water and alcohol particles.

41 Molecules of phosphorus and ammonia respectively are

- (A) monoatomic and triatomic
- (B) monoatomic and diatomic
- (C) tetra-atomic and triatomic
- (D) tetra-atomic and tetra-atomic

42 The elements present in AgNO_3 are

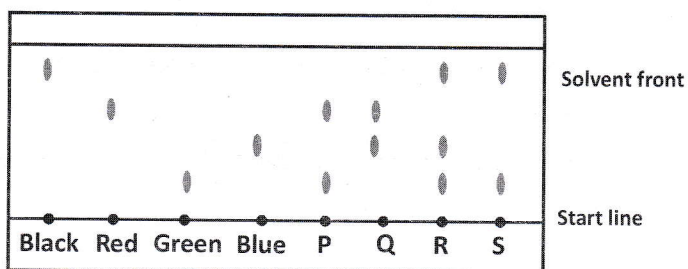
- (A) lead, nitrogen and oxygen.
- (B) silver, nitrogen and oxygen.
- (C) silver, nitrogen dioxide and oxygen.
- (D) argon, nitrogen and oxygen.

Space for rough work

43 0.202g of a carbon compound, on combustion, gave 0.361g of carbon dioxide and 0.47 g of water. Calculate the percentage composition of carbon.

- (A) 48.74 % (B) 18.07 %
(C) 43.17 % (D) 42.17 %

44 A chromatogram obtained by using 4 pure dyes - Red, Green, Blue, Black and 4 unknown dyes P, Q, R, S are shown below.



Which sample contains red and green dyes ?

- (A) P only (B) Q only
(C) R only (D) S only

Space for rough work

- 45** Gas molecules at room temperature are able to move at very high velocities. However, when a bottle of perfume is opened at the end of a large room, it may take several minutes before its smell can be detected at the other end. Which option explains this phenomenon ?
- (A) Random collisions among perfume molecules.
 - (B) Increase in space occupied by perfume molecules.
 - (C) Random collisions of perfume molecules and air molecules.
 - (D) Attractive forces between the air and the perfume molecules.

Space for rough work

46 Which of the following is true about cell membrane ?

- (i) It is mainly composed of proteins and lipids.
- (ii) It aids in maintaining homeostasis in the cell.
- (iii) Carbohydrates are present in least proportion.

- (A) (i) and (ii) only (B) (ii) and (iii) only
(C) (iii) and (i) only (D) (i), (ii), and (iii)

47 Which option is not a function of integumentary system ?

- (A) It regulates body temperature
- (B) It maintains cell fluid
- (C) It helps in the synthesis of vitamin D
- (D) It provides oxygen, nutrients, and hormones to muscles

48 Which of the following statements are true about intercropping ?

- (i) *In intercropping, crops are planted in a fixed pattern.*
- (ii) *Intercropping is a systematic modification of mixed cropping.*
- (iii) *Intercropping allows different crops to be harvested and threshed separately*

- (A) (i) and (ii) only (B) (ii) and (iii) only
(C) (i) and (iii) only (D) (i), (ii), and (iii)

Space for rough work

- 49** The group of diseases caused by bacteria are
- (A) Cholera, typhoid, mumps
 - (B) Diptheria, leprosy, plague
 - (C) Tetanus, tuberculosis, measles
 - (D) Malaria, mumps, poliomyelitis
- 50** Where are fats stored in human body ?
- (A) Bones
 - (B) Cartilage
 - (C) Adipose tissue
 - (D) Cuboidal Epithelium
- 51** What will happen if the sebaceous glands fail to function ?
- (A) The skin will become rough and dry.
 - (B) The skin turns dark because of more melanin secretion.
 - (C) The hair growth declines.
 - (D) The body will not be able to regulate the body temperature.
- 52** Which cell organelle is responsible for autolysis ?
- (A) Dictyosome
 - (B) Glyoxysome
 - (C) Peroxisome
 - (D) Lysosome

Space for rough work

53 Match the two columns.

Column I		Column II	
(P)	Saprophyte	(i)	Symbiotic association of fungi with plant roots
(Q)	Parasite	(ii)	Decomposition of dead organic materials
(R)	Lichens	(iii)	Living on living plants or animals
(S)	Mycorrhiza	(iv)	Symbiotic association of algae and fungi

- (A) P - (iii); Q - (ii); R - (iv); S - (i)
 (B) P - (ii); Q - (iii); R - (i); S - (iv)
 (C) P - (ii); Q - (iii); R - (iv); S - (i)
 (D) P - (i); Q - (ii); R - (iv); S - (iii)

54 Observe the picture of seaweeds given below.



Seaweeds helps in healthy functioning of thyroid gland, as they are rich sources of:

- (A) Flourine (B) Iodine
 (C) Bromine (D) Chlorine

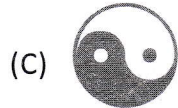
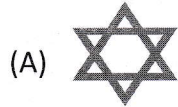
Space for rough work

55 Which cell organelle is composed of a series of channels throughout the cytoplasm that functions in the transport of molecules ?

- (A) Cell wall
- (B) Lysosomes
- (C) Endoplasmic reticulum
- (D) Chloroplast

Space for rough work

56 Which option is the mirror image of itself ?



(D) None of these

57 Read the statement and conclusions.

Statement : Today 1st January 2023 is a Sunday.

Conclusion (1) : 8th March 2023 is a Wednesday.

Conclusion (2) : 8th July 2023 is a Saturday.

Choose the correct option.

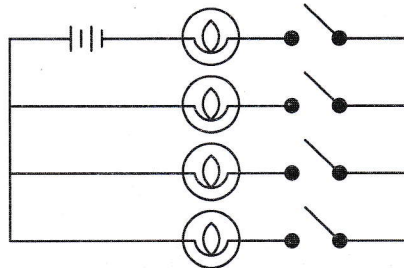
(A) Conclusion (1) is True and Conclusion (2) is False

(B) Conclusion (1) is False and Conclusion (2) is True

(C) Conclusion (1) and Conclusion (2) both are False

(D) Conclusion (1) and Conclusion (2) both are True

58 In the circuit shown, how many switches need to be closed to light up one bulb ?



(A) One

(B) Two

(C) Three

(D) Four

59 *Statement :*

The education minister discussed the importance of flexibility in the education system and regretted that the curriculum had not been revised to match the changing needs of students and the education system.

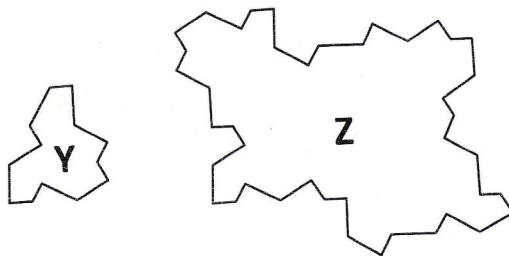
Courses of action :

- (I) The education system should be made more flexible.
- (II) The curriculum should be revised periodically.

Choose the correct option

- (A) Only II follows
- (B) Either I or II follows
- (C) Both I and II follow
- (D) Neither I nor II follows

60 Refer the shape Y and shape Z. How many times does shape Y need to be repeated in order to fill shape Z completely without overlapping and leaving any gaps in between ?



- (A) 7
- (B) 8
- (C) 5
- (D) 6

Space for rough work