



### Class 10<sup>th</sup>

Total Questions : 120

Maximum Marks : 480

Time : 3 Hrs.

### PAPER PATTERN & MARKING SCHEME

Subject	Reasoning		Physics		Chemistry		Biology	Maths	
	SCQ	INT	SCQ	INT	SCQ	INT	SCQ	SCQ	INT
Question type	SCQ	INT	SCQ	INT	SCQ	INT	SCQ	SCQ	INT
No. of ques	20	10	10	5	10	5	15	30	15
Marks per ques.	4	4	4	4	4	4	4	4	4
Negative marks per ques.	1	0	1	0	1	0	1	1	0

SCQ - Single correct answer type questions & INT - Integer answer type questions

#### INSTRUCTIONS – 1:

- The question paper consists of **5 parts (1. Reasoning & Mental ability 2. Physics 3. Chemistry 4. Biology 5. Mathematics)**. Please fill the **OMR** answer Sheet accordingly and carefully.
- This questions paper contains **85 single correct type questions** and **35 Integer answer type questions**.
- Please ensure that the Question Paper you have received contains All the questions in each Section and Pages. If you found some mistake like missing questions or pages then contact immediately to the Invigilator.

#### INSTRUCTIONS – 2:

- Part – 1 contains **20 Single correct type questions** and **10 Integer type questions**.
- Part – 2 and 3 contains **10 Single correct type questions** and **5 Integer type questions**.
- Part – 4 contains **15 Single correct type questions**.
- Part – 5 contains **30 Single correct type questions** and **15 Integer type questions**.
- Indicate the correct answer for each question by filling appropriate bubble in your answer sheet.
- Use of Calculator, Log Table, Slide Rule and Mobile is not allowed.

#### OMR filling instructions for SCQ.

**INSTRUCTIONS**

- "Think before your ink".
- Marking should be done with Blue/Black Ball Point Pen only.
- Darken only one circle for each question as shown in Example Below.

<b>WRONG METHODS</b>	<b>CORRECT METHOD</b>

- If more than one circle is darkened or if the response is marked in any other way as shown "WRONG" above, it shall be treated as wrong way of marking.
- Make the marks only in the spaces provided.
- Carefully tear off the duplicate copy of the OMR without tampering the Original.
- Please do not make any stray marks on the answer sheet.

#### OMR filling instructions for SCQ.

<b>Q. 1</b>	<b>Q. 2</b>

### MATRIX OLYMPIAD FOUNDATION

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5. How many c's are there in between two consonants in the following series ?

**c a b c d c d c e c f c o c i c j k c k c k**

- (A) 4                      (B) 5                      (C) 6                      (D) 11

**Directions :** Study the following arrangement carefully and answer the questions given below:

8 C M @ N £ T 2 Y 6 S α Q \$ 7 ★ W # Z 3 U E % A 4

6. How many symbols are there in the above series, which of the following would be the eighth element to the right of the thirteenth element from the left end?

- (A) Nil                      (B) One                      (C) Two                      (D) Three

7. Number of letters skipped in between adjacent tletters in the series decreases by two. Which of the following series observes this rule ?

- (A) FQWBG                      (B) HQXCF                      (C) TBINO                      (D) XFMQU

8. If  $A + E = B + D$ ,  $A + B > C + E$ ,  $A + D = 2B$ ,  $C + E > B + D$ , then

- (A)  $A > B > C > D > E$                       (B)  $C > B > D > A > E$   
(C)  $C > B > A > E > D$                       (D)  $C > A > B > D > E$

9. Arrange the following in a meaningful sequence :

1. Grass                      2. Curd                      3. Milk                      4. Cow                      5. Butter

- (A) 1, 2, 3, 4, 5                      (B) 2, 3, 4, 5, 1                      (C) 4, 1, 3, 2, 5                      (D) 5, 4, 3, 2, 1

10. In a certain code, RAIN is written as 8\$%6 and MORE is written as 7#8@. How is REMAIN written in that code?

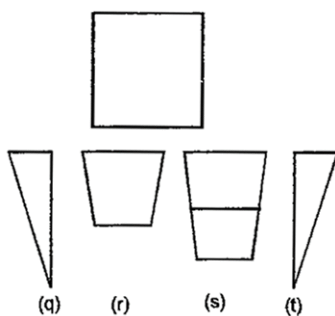
- (A) #@7\$%6                      (B) #@&\$%6                      (C) 7#@#\$%6                      (D) 8@7\$%6

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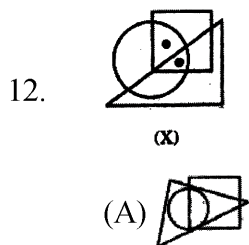


11. A pattern is given below. You have to identify which among the following pieces will not be required to complete the pattern.



- (A) q                      (B) r                      (C) s                      (D) t

**Direction :** In the following question a dot is placed in the figure marked as (X), this figure is followed by four alternatives marked as (A), (B), (C) and (D). One out of these four options contains the common region to circle, square, triangle and rectangle similar to that of marked by dot in figure (X). Select that option.



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**Directions :** The following questions are related to paper cutting. The questions that follow contain a set of three figures X, Y and Z, showing a sequence of folding of a piece of paper. Fig. (Z) shown the manner in which the folded paper has been cut. These three figures are followed by four answer figures A, B, C and D (Ind set) from which you have to choose a figure which would most closely resemble the unfolded form of fig. (Z).

13



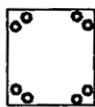
X



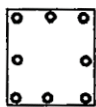
Y



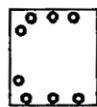
Z



(A)



(B)



(C)



(D)

**Direction :** Find the correct water-image of the given figure.

14. NhRqSy

(A) NpRqSy

(B) NpRqSy

(C) NpRqSy

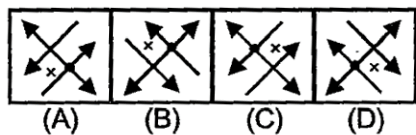
(D) NpRqSy

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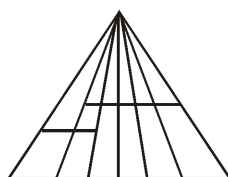


**Directions :** In each of the following questions, choose the correct mirror image from alternatives (A), (B), (C) and (D) of the Word / figure (X).

15.



16. Count the number of triangles in given figure.



(A) 38

(B) 39

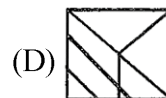
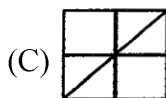
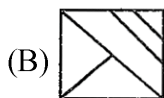
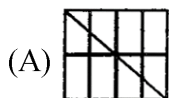
(C) 40

(D) 41

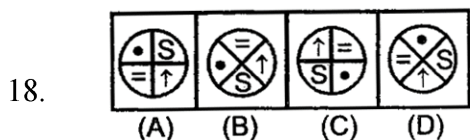
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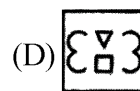
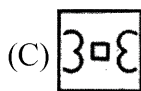
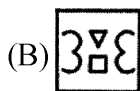
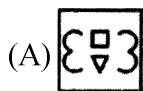
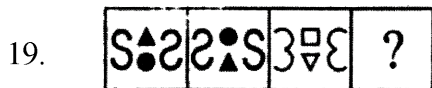
**Directions :** In each of the following questions, choose the alternative figure in which the questions figure is embedded.



**Directions :** Out of the four figures (A), (B), (C) and (D), given in each problem, there are similar in a certain way. However, one figure is not like the other three. Choose the figure which is different from the rest.



**Directions :** In the following questions there are two sets of figures. One set is problem figures and the second set is a answer figures. There is some relationship between the first and the second figure of the problem figures set. If there is similar relationship between the third and fourth figures of the same set, select the correct figure from the set of answer figures for question mark (?).



*Space for Rough Work*



**Directions :** Each of the following questions consists of five problem figure. These problem figures form a series. Find out the one figure from the answer figures that will continue the series.

20.

**Problem figures****Answer Figures**

1

2

3

4

(A) 1

(B) 2

(C) 3

(D) 4

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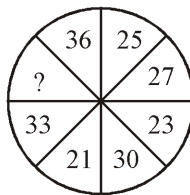




Question No. 21 – 30 are of Integer Answer Type Question.

Answer of these question will come from 00 to 99.

21. Replace the question mark.  
2, 4, 7, 14, 17, 34, ?
22. Choose the correct alternative.  
 $7 : 24 :: ? : 72$
23. Choose the number which is different from others in the group  
8, 27, 60, 125
24. Find the missing character ?



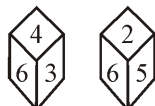
25. In a certain code, '329' means 'GOD IS LOVE', '927' means 'LOVE IS BEATIFUL'. What is the code for 'GOD'?

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*Space for Rough Work*



26. If  $P = 16$ ,  $NC = 17$  and  $AEO = 21$ , then what is the value of  $NEHLA$  ?
27. The length and breadth of a room are 8m and 6m respectively. A cat runs along all the four wall and finally along a diagonal order to catch a rat. How much total distance is covered by the cat ?
28. A boy rode his bicycle North word, then turned left and rode 1 km and again himself 1 km west of his starting point. How far did he ride northward initially?
29. Two different positions of a disce are shown below. Which number lies opposite to 6 ?



30. (a) All the faces of a cube with edge 4 cm are painted.  
(b) The cube is then cut into equal small cube 8 each of edge 1 cm.  
How many small cubes are there whose two faces are painted ?

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*Space for Rough Work*



**Part – 2 contains 10 Single correct type questions and 5 Integer type questions.**

**Question No. 31 – 40 are of Single Correct Answer Type Question.**

**Four options are given in each question out of which only one option is correct.**

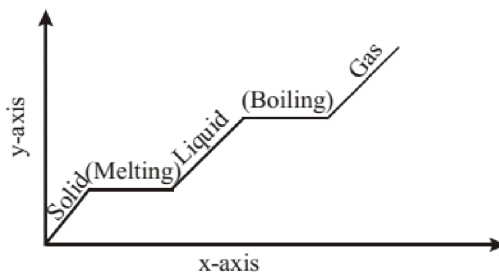
31. The force which is only attractive in nature is
- (A) Gravitational force                      (B) Electrostatic force  
(C) Magnetic force                          (D) Both electrostatic and magnetic force
32. Read statement-1 and statement-2 and choose the correct option.  
Statement-1 : In some situations, friction facilitates the motion and in some situations, it opposes the motion.  
Statement-2 : Friction force always opposes the relative motion between two surfaces in contact.  
Choose the correct option.
- (A) Only statement-1 is correct  
(B) Only statement-2 is correct  
(C) Both statement-1 and statement-2 are correct  
(D) Neither statement-1 nor statement-2 is correct

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*Space for Rough Work*



33. Dhruv made this chart about an experiment in his science class. In this experiment, the students watched a piece of ice warm and change from a solid to a gas on a stove.  
What should Dhruv label the x-axis and the y-axis on the chart?



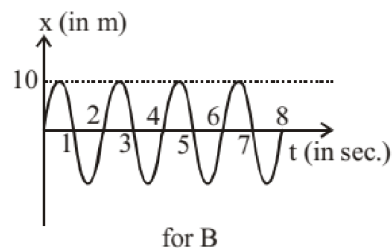
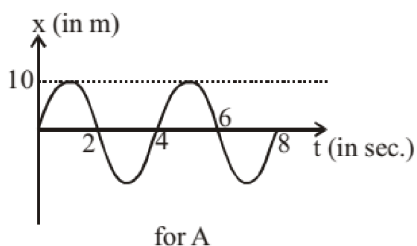
- (A) x-axis: time ; y-axis: temperature                      (B) x-axis: temperature ; y-axis: time  
(C) x-axis: weight ; y-axis: time                              (D) x-axis: temperature ; y-axis: weight
34. Which of the following motions is not uniform?
- (A) A satellite in orbit around the Earth.  
(B) A ball rolls along a table without changing velocity.  
(C) A jogger runs 50 m along a straight track at a constant speed.  
(D) An elevator moves vertically upward at zero acceleration.
35. Two sounds of same pitch and loudness may differ in their
- (A) Amplitudes of waves    (B) Frequencies of waves  
(C) Shapes of waves    (D) Both 1 and 2

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*Space for Rough Work*

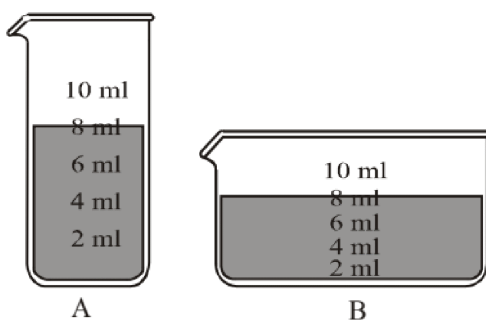


36. Sound waves generated by two sources A and B are shown by the graphs.



- (A) Pitch of A is higher than pitch of B.      (B) Pitch of B is higher than pitch of A.  
(C) Pitch of A and B is same.      (D) Information is insufficient to comment on pitch.

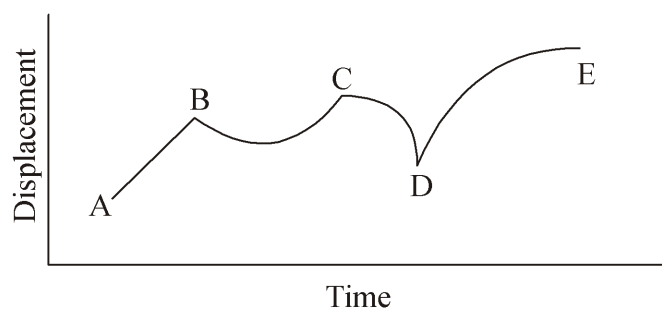
37. In these two pictures, where is the water pressure greatest?



- (A) The bottom of beaker A      (B) The bottom of beaker B  
(C) The top of beaker A      (D) The top of beaker B

*Space for Rough Work*

38. The figure given below shows the displacement plotted against time for a particle. In which region is the force acting on the particle zero ?



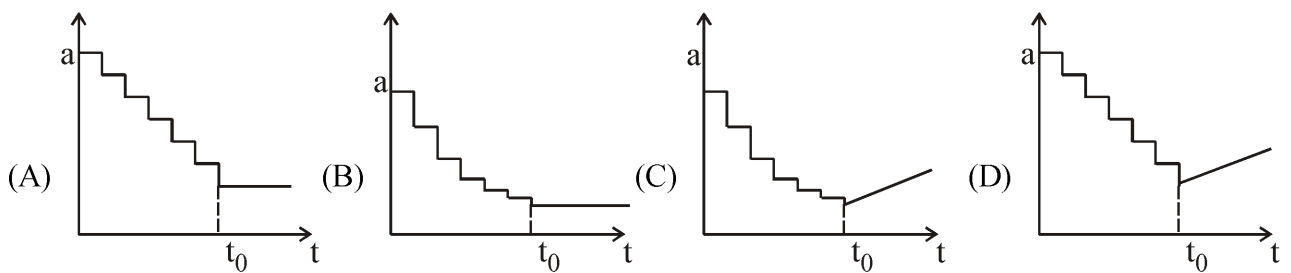
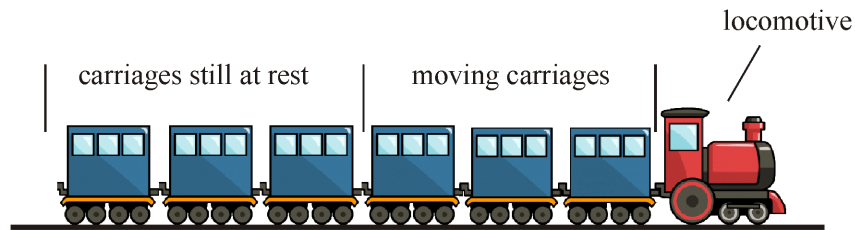
- (A) AB                      (B) BC                      (C) CD                      (D) DE
39. A person standing on the floor of a lift drops a coin. The coin reaches the floor of the lift in a time  $t_1$  if the lift is stationary and in time  $t_2$  if its moving uniformly. Then .
- (A)  $t_1 = t_2$   
(B)  $t_1 < t_2$   
(C)  $t_1 > t_2$   
(D)  $t_1 < t_2$  or  $t_1 > t_2$  depending on whether the lift is going up or down.

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*Space for Rough Work*



40. When a locomotive starts to pull a train, the identical carriages start to move one by one as shown. The locomotive in the diagram produces a constant force. As time goes on, more carriages begin to move, one at a time. The time  $t_0$  is the moment when the last carriage starts moving. Which of the graphs shows the acceleration of the train?



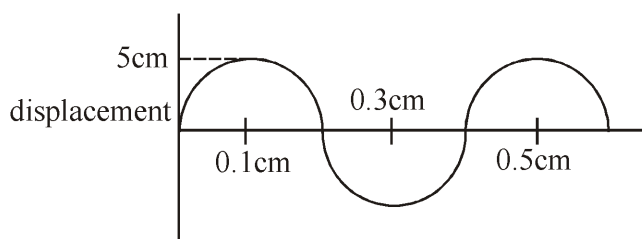
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**Question No. 41 – 45 are of Integer Answer Type Question.**

Answer of these question will come from **00 to 99**.

41. A planet of volume  $V$  and mass  $M$  has gravitational acceleration  $g$  on its surface. If it expands to 8 times of its original volume, what will be the acceleration due to gravity.
42. Capacity of a measuring flask is 1 litre. What it will be in cubic centimetre ?
43. Figure shows a sound wave having a frequency of 250 Hz. What is the velocity of the wave ?



44. A periodic longitudinal wave that has a frequency of 20.0 Hz travels along a coil spring. If the distance between successive compressions is 0.60 m, what is the speed of the wave ?
45. An ocean wave has a length of 12.0 m. A wave passes a fixed location every 3.0 s. What is the speed of the wave ?

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*Space for Rough Work*





**Part – 3 contains 10 Single correct type questions and 5 Integer type questions.**

**Question No. 46 – 55 are of Single Correct Answer Type Question.**

**Four options are given in each question out of which only one option is correct.**

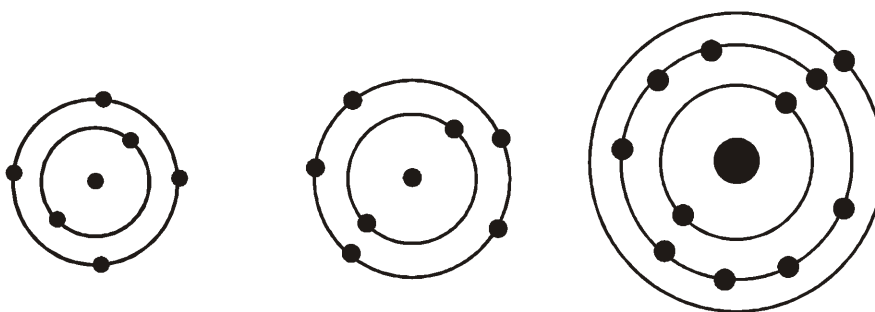
46. During summer, water left in an earthen pot becomes cool because of phenomenon of -  
(A) Diffusion                      (B) Transpiration                      (C) Osmosis                      (D) Evaporation
47. A few substances are arranged in increasing order of forces of attraction between their particles. Which one of the following represents a correct arrangement ?  
(A) Water, air, wind                      (B) Air, sugar, oil  
(C) Oxygen, water, sugar                      (D) Salt, juice, air
48. If a few grams of salt are dissolved in pure water then -  
(A) Its B.pt. becomes less than 100°C                      (B) Its B.pt. becomes more than 100°C  
(C) Its freezing pt. becomes more than 0°C                      (D) None of these
49. Which of the following will show Tyndall effect ?  
(A) Starch solution                      (B) Sodium chloride solution  
(C) Copper sulphate solution                      (D) Sugar solution
50. A mixture of sulphur and iron filings heated strongly to obtain a residue. Which following is not a characteristic property of the residue ?  
(A) It can be separated into sulphur and iron filings by physical methods  
(B) Its composition does not change from one part to another  
(C) Its properties are entirely different from those of sulphur and iron filings  
(D) Its appearance is different from those of sulphur and iron filings

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*Space for Rough Work*



51. Principle of chromatography is -  
(A) Rate of absorption (B) Rate of adsorption  
(C) Rate of diffusion (D) None of these
52. Which of the following has largest number of molecules ?  
(A) 8g of  $\text{CH}_4$  (B) 4.4 g of  $\text{CO}_2$  (C) 34.2 g of  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$  (D) 2g of  $\text{H}_2$
53. Hydrogen and oxygen combine in ratio of 1 : 8 by mass to form water. Water mass of oxygen would be required to react completely with 3g of Hydrogen gas ?  
(A) 24g (B) 27g (C) 21g (D) 3g
54. When calcium is heated, it gives :  
(A)  $\text{CaO}$  &  $\text{Co}$  (B)  $\text{Ca}$  &  $\text{CO}_2$  (C)  $\text{CaO}$  &  $\text{CO}_2$  (D) None of these
55. Schematic atomic structures of three elements are given below :



Which of following is correct formula of the compound formula by given three elements ?

- (A)  $\text{Na}_3\text{PO}_4$  (B)  $\text{Na}_2\text{CO}_3$  (C)  $\text{Na}_2\text{SO}_4$  (D)  $\text{Na}_2\text{SO}_3$

*Space for Rough Work*



**Question No. 56 – 60 are of Integer Answer Type Question.**

Answer of these question will come from **00 to 99**.

56. What is mass of 0.5 mole of water molecules ?
57. The number of substens in second energy level is.
58.  $6.022 \times 10^{23}$  molecules of  $O_2$  is equal to how many moles ?
59. What is melting point of ice ?
60. How many of following is homoqueous mixture ?  
Water, Air, Steel Smog, Soda

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*Space for Rough Work*



**Part – 4 contains 15 Single correct type questions.**

**Question No. 61 – 75 are of Single Correct Answer Type Question.**

**Four options are given in each question out of which only one option is correct.**

61. The \_\_\_\_\_ lead to vas deferens that ascends to the \_\_\_\_\_ and loops over the \_\_\_\_\_.
- (A) Prostate, stomach, urinary bladder.  
(B) Epididymis, abdomen, urinary bladder.  
(C) Vas efferentia, abdomen, ureter.  
(D) Urinary bladder, ejaculatory duct, abdomen.
62. In the given columns, column I contain structures of male reproductive system and column II contains its feature. Select the correct match from the options given below.

**Column I****(Structure of Male Reproductive System)**

A. Seminiferous tubule

B. Rete testis

C. Leydig cells

D. Prepuce

(A) A – I; B – II; C – III; D – V

(C) A – III; B – I; C – IV; D – II

**Column II****(Features)**

I. Network of seminiferous tubule

II. Secondary sexual characters

III. Meiosis and sperm formation occurs

IV. Place of implantation

V. Terminal skin of penis

(B) A – III; B – I; C – II; D – V

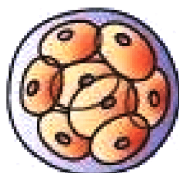
(D) A – II; B – IV; C – III; D – V

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*Space for Rough Work*



63. The given figure represent a stage of embryonic development. Identify the stage with its feature.



- (A) Blastocysts, ready to fertilize with sperm.
  - (B) Secondary oocyte, implants on endometrial layer of uterus.
  - (C) Morula, formed by mitotic division of zygote.
  - (D) Ovary, produce female gamete and secretes hormones like estrogen etc
64. According to which of the following organization "reproductive health means a total well-being in all aspects of reproduction"?
- (A) WHL
  - (B) UNESCO
  - (C) WHO
  - (D) WWW
65. Which one amongst the following is the first country in the world to initiate action plans and programmes at a national level to attain total reproductive health as social goal?
- (A) China
  - (B) India
  - (C) Japan
  - (d) USA
66. The family planning programmes in India were initiated in
- (A) 1951
  - (B) 1961
  - (C) 1971
  - (D) 1981

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*Space for Rough Work*



67. Mendel's last law is
- (A) Segregation (B) dominance  
(C) independent assortment (D) polygenic inheritance
68. Which one of the following cannot be explained on the basis of Mendel's law of dominance?
- (A) The discrete unit controlling a particular character is called a factor.  
(B) Out of one pair of factors' one is dominant and the other is recessive.  
(C) Alleles do not show any blending and both the characters recover as such in  $F_2$  generation.  
(D) Factors occur in pairs.
69. Match column-I with column-II and select the correct answer using the codes given below.

**Column-I**

- A. ABO blood groups  
B. Law of segregation  
C. Law of Independent

D. Gene mutation

- (A) A – II; B – I; C – IV; D – III  
(B) A – IV; B – I; C – II; D – III  
(C) A – IV; B – II; C – I; D – III  
(D) A – II; B – III; C – IV; D – I

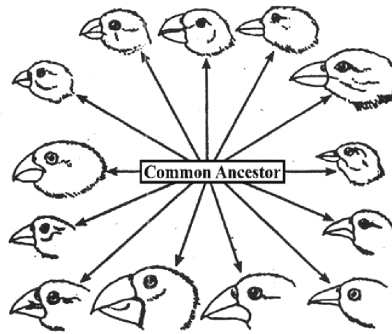
**Column-II**

- I. Dihybrid cross  
II. Monohybrid cross  
III. Base pairs substitution  
assortment  
IV. Multiple allelism

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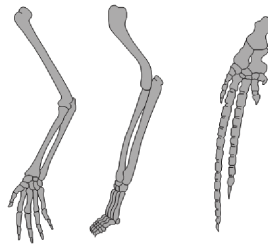
*Space for Rough Work*

70. The diversity within the wild bird species in the diagram below can best be explained by which process?



- (A) Natural selection  
(B) Ecological succession  
(C) Adaptive radiation  
(D) Both (a) and (c)

71. The given bones in the forelimbs of three mammals figure shows.



For these mammals, the number, position, and shape of the bones must likely indicates that they may have

- (A) Developed in a common environment.  
(B) Developed from the same earlier species.  
(C) Identical genetic makeup.  
(D) Identical methods of obtaining food.

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*Space for Rough Work*



72. Stanley L. Miller conducted experiments before 1953 on prebiotic earth environment using special apparatus. The primary surprising products were
- (A) Amino acids (B) Peptides  
(C) Nucleotides (D) Simple sugars
73. Flowers are highly modified \_\_\_\_\_.
- (A) Root (B) Shoot  
(C) Stem (D) Leaves
74. A typical flower has \_\_\_\_\_ different kinds of whorl.
- (A) Two (B) Three  
(C) Four (D) Five
75. Anther is typically
- (A) Tetrasporangiate (B) Bisporangiate  
(C) Trisporangiate (D) Monosporangiate

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**Part – 5 contains 30 Single correct type questions and 15 Integer type questions.**

**Question No. 76 – 105 are of Single Correct Answer Type Question.**

**Four options are given in each question out of which only one option is correct.**

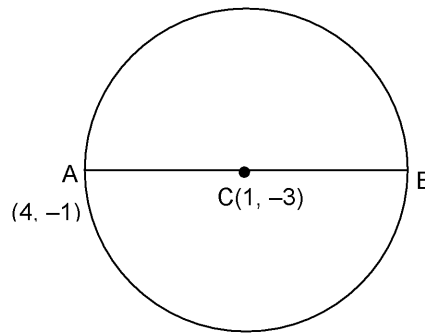
76. The rationalising factor of  $\sqrt[5]{a^2b^3c^4}$  is  
(A)  $\sqrt[5]{a^3b^2c}$  (B)  $\sqrt[4]{a^3b^2c}$  (C)  $\sqrt[3]{a^3b^2c}$  (D)  $\sqrt[5]{a^3b^2c}$
77. The value of  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{99 \times 100}$  is  
(A) Less than  $\frac{99}{100}$  (B) Equal to  $\frac{99}{100}$  (C) Greater than  $\frac{100}{99}$  (D) Equal to  $\frac{100}{99}$
78. If  $(x + a)$  is the factor of the polynomial  $(x^2 + px + q)$  and  $(x^2 + mx + n)$ , then the value of 'a' is  
(A)  $\frac{n - q}{m - p}$  (B)  $\frac{m - p}{n - q}$  (C)  $\frac{q - n}{m - p}$  (D)  $\frac{m - p}{q - n}$
79. If  $k^3 = \frac{1 \times 2 \times 4 + 2 \times 4 \times 8 + \dots + 100 \times 200 \times 400}{1 \times 3 \times 9 + 2 \times 6 \times 18 + \dots + 100 \times 300 \times 900}$   
and  $(x - 3k)$  is a factor of the polynomial  $p(x) = x^2 + ax - 4$ , then the value of a is :  
(A) 0 (B)  $\frac{2}{3}$  (C)  $\frac{8}{27}$  (D) 1

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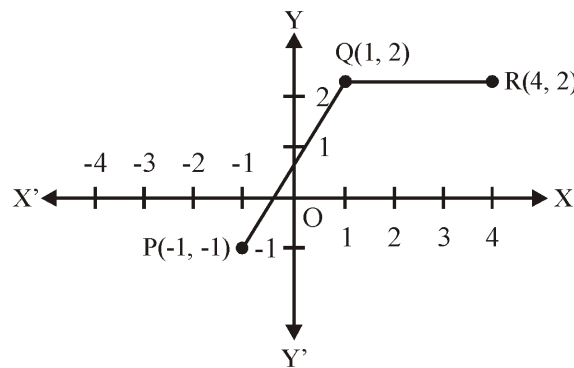
*Space for Rough Work*



80. The coordinates of one end point of a diameter AB of a circle are A(4, -1) and the coordinates of the centre of the circle are C(1, -3). Then, the coordinates of B are



- (A) (2, -5)                      (B) (-2, 5)                      (C) (-2, -5)                      (D) (2, 5)
81. What would be the coordinates of point S for points P, Q, R and S to form a parallelogram ?

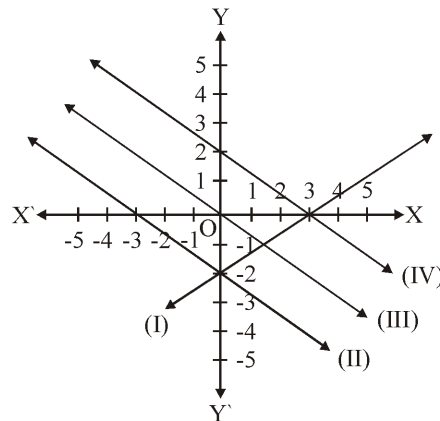


- (A) (4, 2)                      (B) (2, -1)                      (C) (4, -2)                      (D) (3, -1)
82.  $ax + by + c = 0$  does not represent equation of line, if :
- (A)  $a = c = 0, b \neq 0$                       (B)  $c = 0, a \neq 0, b \neq 0$   
(C)  $b = c = 0, a \neq 0$                       (D)  $a = b = 0$

*Space for Rough Work*



83. The graph of the equation  $2x + 3y = 6$  is :



- (A) I                      (B) II                      (C) III                      (D) IV

84. Graphically the pair of equations  $6x - 3y + 10 = 0$ ,  $2x - y + 9 = 0$  represent two lines which are

- (A) intersecting exactly at one point  
(B) intersecting exactly at two points  
(C) coincident  
(D) parallel

85. If a point P is on the line  $l$ , then consider the following statements.

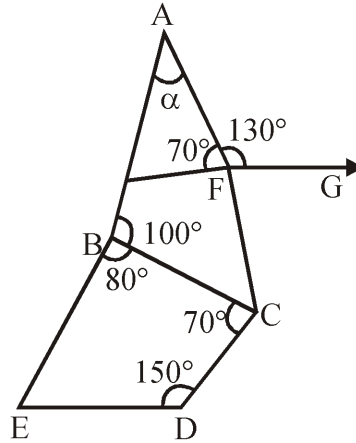
- |                              |                                       |
|------------------------------|---------------------------------------|
| (i) P does not lie on $l$    | (ii) P is not incident on $l$         |
| (iii) $l$ does not contain P | (iv) $l$ does not pass through P      |
| (A) (i), (ii) are false      | (B) (iii), (iv) are false             |
| (C) Only (iii) is false      | (D) All the four statements are false |

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*Space for Rough Work*



86. Consider the following statements :
- (i) Three lines are concurrent if they have only one common point.
  - (ii) Two distinct points always determine a line.
- (A) (i) is true, (ii) is false                      (B) (i) is false, (ii) is true  
(C) Both (i) and (ii) are true                      (D) Both (i) and (ii) are false
87.  $FG \parallel DE$ , find  $\angle BAF = \alpha$ , as shown in figure

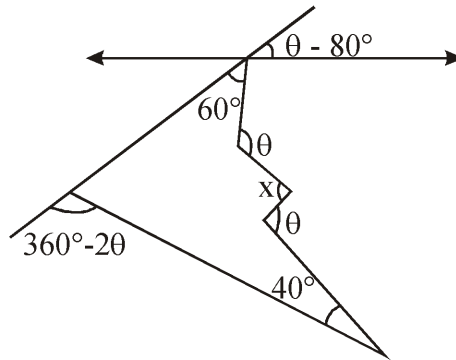


- (A)  $55^\circ$                       (B)  $60^\circ$                       (C)  $65^\circ$                       (D)  $70^\circ$

*Space for Rough Work*



88. In the given figure, find the value of  $x$ .



- (A)  $70^\circ$                       (B)  $80^\circ$                       (C)  $90^\circ$                       (D)  $100^\circ$

89. Study the following statements carefully and select the correct option.

Cards marked with the consecutive odd numbers from 1 to 200 are put in a box and mixed thoroughly. One card is drawn at random from the box.

**Statement – 1 :** Probability that drawn card is multiple of 3 is  $\frac{1}{2}$ .

**Statement – 2 :** Probability that drawn card is a perfect square and a multiple of 9 both is  $\frac{2}{3}$ .

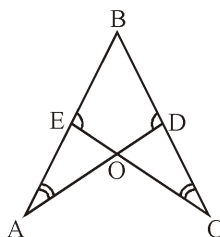
- (A) Both statement-1 and Statement-2 are true.  
(B) Both statement-1 and statement-2 are false.  
(C) Statement-1 is true but statement-2 is false.  
(D) Statement-1 is false but statement-2 is true.

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*Space for Rough Work*



90. In given figure,  $\angle A = \angle C$  and  $AB = BC$ . Then which of following is correct ?



(A)  $\angle OEB = \angle ODB$

(B)  $\triangle ABD \cong \triangle CBE$

(C)  $\angle AEO = \angle CDO$

(D) All of these

91. The point of concurrency of perpendicular bisectors of the sides of a triangle is known as

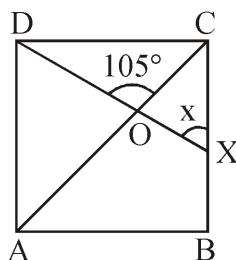
(A) Centre of gravity

(B) Orthocentre

(C) Incentre

(D) Circumcentre

92. In the given figure, if ABCD is a square, the value of x is :



(A)  $45^\circ$

(B)  $60^\circ$

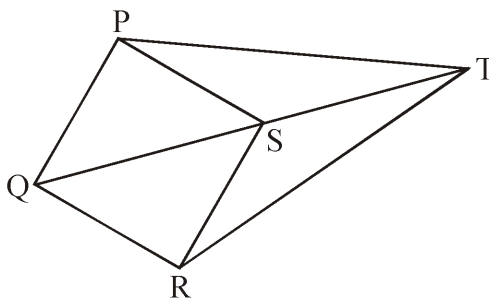
(C)  $70^\circ$

(D)  $36^\circ$

*Space for Rough Work*



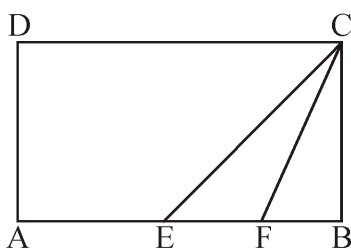
93. In the figure,  $PQ = QR = RS = SP = SQ = 6$  cm and  $PT = RT = 14$  cm. The length of  $ST$  (in cm) is



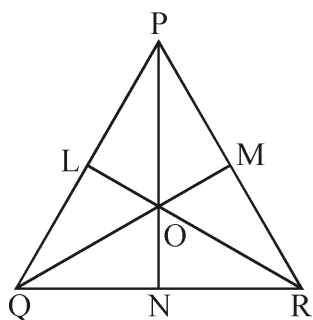
- (A)  $4\sqrt{10}$       (B)  $(7\sqrt{3} - 2)$       (C) 10      (D) 11
94. If the difference between the probability of success and failure of an event is  $\frac{5}{19}$ , then the probability of success and failure of the event respectively are
- (A)  $\frac{12}{19}, \frac{7}{19}$       (B)  $\frac{7}{19}, \frac{12}{19}$       (C)  $\frac{11}{19}, \frac{8}{19}$       (D)  $\frac{8}{19}, \frac{11}{19}$
95. ABCD is a parallelogram. E is a point on BA such that  $BE = 2EA$  and F is a point on DC such that  $DF = 2FC$ . If  $\text{ar}(AECF) = k[\text{ar}(ABCD)]$ , then k equals
- (A)  $\frac{1}{3}$       (B)  $\frac{2}{3}$       (C)  $\frac{4}{3}$       (D)  $\frac{3}{4}$



96. In the figure ABCD is a rectangle with  $AE = EF = FB$ , the ratio of the areas of triangle CEF and that of rectangle ABCD is



- (A) 1 : 6                      (B) 1 : 8                      (C) 1 : 9                      (D) 1 : 10
97. If the medians of  $\Delta PQR$  intersect at O, then  $\text{ar}(\Delta POQ) =$

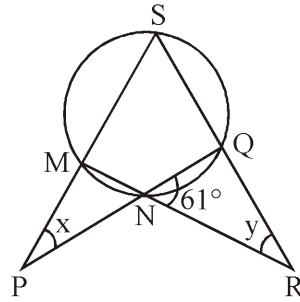


- (A)  $\text{ar}(\Delta QOR)$                       (B)  $\frac{1}{3} \text{ar}(\Delta PQR)$   
(C) Both (A) and (B)                      (D) Neither (A) nor (B)





98. In the given figure, MNQS is a cyclic quadrilateral in which  $\angle QNR = 61^\circ$  and  $x : y$  is  $2 : 1$ . The values of  $x$  and  $y$  respectively are :



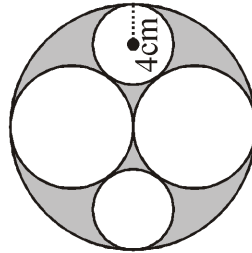
- (A)  $18\frac{1^\circ}{4}, 37\frac{3^\circ}{4}$       (B)  $38\frac{2^\circ}{3}, 19\frac{1^\circ}{3}$       (C)  $21\frac{1^\circ}{3}, 33\frac{2^\circ}{3}$       (D)  $19\frac{1^\circ}{4}, 38\frac{1^\circ}{4}$

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*Space for Rough Work*



99. The figure below is made up of one big circle, two identical medium circles and two identical small circles. The ratio of the radius of the small circle to the radius of the medium circle is 2 : 3.
- (i) What is the total area of the unshaded part in the figure ?
- (ii) What fraction of the big circle is shaded ?



- |                            |                 |
|----------------------------|-----------------|
| (i)                        | (ii)            |
| (A) $144 \pi \text{ cm}^2$ | $\frac{5}{18}$  |
| (B) $104 \pi \text{ cm}^2$ | $\frac{5}{18}$  |
| (C) $104 \pi \text{ cm}^2$ | $\frac{13}{18}$ |
| (D) $144 \pi \text{ cm}^2$ | $\frac{13}{18}$ |

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*Space for Rough Work*



100. Which of the following steps is incorrect while constructing an equilateral triangle one of whose altitudes measures 5 cm ?

**Step – I :** Draw a line XY.

**Step – II :** Mark any point P on it.

**Step – III :** From P, draw  $PQ \perp XY$ .

**Step – IV :** From P, set off  $PA = 5$  cm, cutting PQ at A.

**Step – V :** Construct  $\angle PAB = 60^\circ$  and  $\angle PAC = 60^\circ$ , meeting XY at B and C respectively.

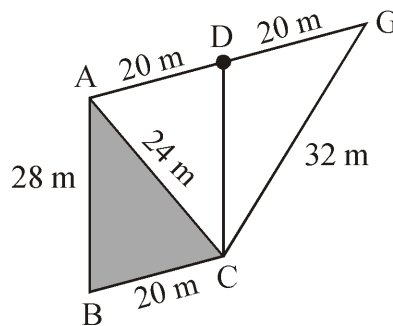
Then,  $\Delta ABC$  is the required equilateral triangle.

(A) Step IV                      (B) Step V                      (C) Step III                      (D) None of these

101. Two sides of a parallelogram are 12 cm and 9 cm. if the distance between its shorter sides is 8 cm, then the distance between the longer sides is

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

102. Find the ratio of the shaded area to the area of the quadrilateral ABCD.



(A)  $2 + \sqrt{6} : \sqrt{6}$                       (B)  $3 : 2 + \sqrt{6}$                       (C)  $\sqrt{6} : 2 + \sqrt{6}$                       (D)  $\sqrt{6} : 4 + \sqrt{6}$

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*Space for Rough Work*



103. The percentage increase in the surface area of a cube when each side is doubled, is :  
(A) 25%                      (B) 50%                      (C) 150%                      (D) 300%
104. If  $\bar{X}$  is the mean of  $x_1, x_2, \dots, x_n$ , then for  $a \neq 0$ , the mean of  $ax_1, ax_2, \dots, ax_n, \frac{x_1}{a}, \frac{x_2}{a}, \dots, \frac{x_n}{a}$  is :  
(A)  $\left(a + \frac{1}{a}\right)\bar{X}$               (B)  $\left(a + \frac{1}{a}\right)\frac{\bar{X}}{2}$               (C)  $\left(a + \frac{1}{a}\right)\frac{\bar{X}}{n}$               (D)  $\frac{\left(a + \frac{1}{a}\right)\bar{X}}{2n}$
105. For drawing a frequency polygon of a continuous frequency distribution, we plot the points whose ordinates are the frequencies of the respective classes and abscissa are respectively, the  
(A) Upper limits of the classes                      (B) Lower limits of the classes  
(C) Class marks of the classes                      (D) Upper limits of preceding classes

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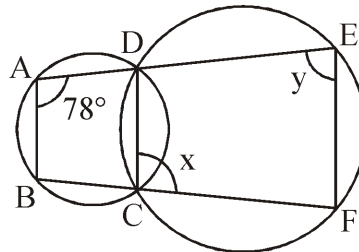
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Question No. 106 – 120 are of Integer Answer Type Question.

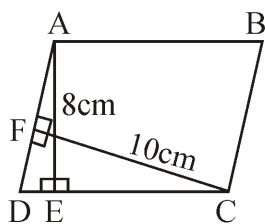
Answer of these question will come from 00 to 99.

106. Ram and Priya are playing a game. Ram's winning probability is  $\frac{1}{3}$  and sum of their winning probability is 1. Numerator of Priya's winning probability is :
107. In a frequency distribution, the mid-value of a class is 10 and width of each class is 6. The upper limit of the class is
108. A metallic hemisphere is melted and recast in the shape of cone with the same base radius R as that of the hemisphere. If H is the height of the cone, then find the value of  $\frac{H}{R}$ .
109. The sides of a triangular field measure 51 m, 37 m and 20 m. The cost of levelling it at ₹ 5 per m<sup>2</sup> is ₹ k. The value of  $\frac{k}{15}$  is
110. The construction of a  $\triangle LMN$  in which  $LM = 8$  cm,  $\angle L = 45^\circ$  is possible when  $(MN + LN)$  is
111. In the given figure,  $\angle BAD = 78^\circ$ ,  $\angle DCF = x$  and  $\angle DEF = y$ . The value of  $\frac{2x - y}{9^\circ}$  is :

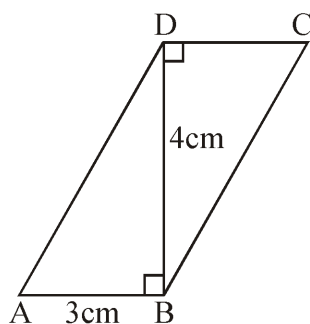


*Space for Rough Work*

112. In figure, ABCD is a parallelogram,  $AE \perp DC$  and  $CF \perp AD$ . If  $AD = 12$  cm,  $AE = 8$  cm and  $CF = 10$  cm, find CD.



113. In the adjoining figure, ABCD is a parallelogram. Then its area is equal to

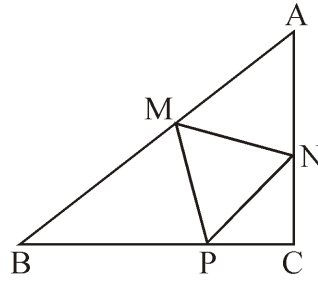



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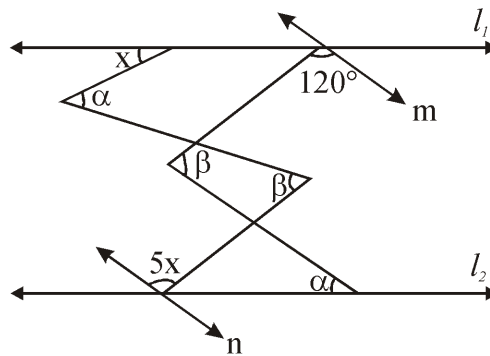
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114. In the given figure, M, N and P are the midpoints of AB, AC and BC respectively. If  $MN = 3$  cm,  $NP = 3.5$  cm and  $MP = 2.5$  cm, then  $(BC + AC) - AB$  is.



115. In the given figure, if  $l_1 \parallel l_2$  and  $m \parallel n$ , then find the value of  $x$ .



*Space for Rough Work*



116. If the system of equations  $4x + 6y = 7$ ,  $4ax + 2(a + b)y = 28$  has infinitely many solutions, then  $b = ka$ . Find value of  $k$ .
117. The area of the  $\Delta OAB$  with  $O(0, 0)$ ,  $A(4, 0)$  and  $B(0, 6)$  is
118. Let  $a = \sqrt[3]{6 + \sqrt{2 + \sqrt[3]{6 + \sqrt{2 + \sqrt[3]{6 + \sqrt{2 + \dots}}}}}}$ . If  $p(x)$  is a polynomial of degree 6 such that  $p(a) = 0$ , then  $p(2)$  equals
119. If  $R_1$  and  $R_2$  are remainders when  $x^3 + 2x^2 - 5ax - 7$  and  $x^3 + ax^2 - 12x + 6$  are divided by  $x + 2$  and  $x - 2$  respectively and if  $R_1 - R_2 = 33$ , then the value of  $a$  is :
120. If  $N = \frac{\sqrt{\sqrt{5} + 2} + \sqrt{\sqrt{5} - 2}}{\sqrt{\sqrt{5} + 1}} - \sqrt{3 - 2\sqrt{2}}$ , then  $N + 2$  equals

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*Space for Rough Work*