

**SOF INTERNATIONAL
MATHEMATICS OLYMPIAD
2024-25**

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

CLASS **11**
SET-B

Total Questions : 50 | Time : 1 hr.

Guidelines for the Candidate

1. You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
2. Write your **Name, School Code, Class, Section, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it. We will share your marks / result and other information related to SOF exams on your mobile number.
3. The Question Paper comprises four sections :
Section - 1: **Logical Reasoning** (15 Questions)
Section - 2 : **Mathematical Reasoning** (20 Questions) or **Applied Mathematics** (20 Questions)
Section - 3 : **Everyday Mathematics** (10 Questions)
Section - 4 : **Achievers Section** (5 Questions)
4. **Section-1, 3 and 4 are compulsory for all.** In Section-2 opt for Mathematical Reasoning OR Applied Mathematics and mark the same on the OMR Sheet.
Each question in Achievers Section carries 3 marks, whereas all other questions carry one mark each.
5. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
6. There is only ONE correct answer. Choose only ONE option for an answer.
7. To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only. E.g.
Q. 16: Navya purchased a hand bag for ₹ 345.50, a pair of shoes for ₹ 480.25 and a cap for ₹ 75.50. How much money did she spend in all?
A. ₹ 901.25 B. ₹ 785.50 C. ₹ 895.75 D. ₹ 920.25
As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.
8. Rough work should be done in the blank space provided in the booklet.
9. Return the OMR Sheet to the invigilator at the end of the exam.
10. Please fill in your personal details in the space provided before attempting the paper.

16. ● (B) (C) (D)

Name:.....

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LOGICAL REASONING

1. Study the below given statements carefully.

J*K means J is smaller than K.

J@K means J is neither smaller nor greater than K.

J@K means J is neither smaller nor equal to K.

J#K means J is not greater than K.

JφK means J is not smaller than K.

Assuming the following statements to be true, you have to decide which of the following conclusion(s) is/are definitely true.

Statement : K@LφM*N@O#P

Conclusions : I. N*P

II. N@P

- A. Only I
- B. Only II
- C. Neither I nor II
- D. Either I or II

2. Select the set of numbers, that is similar to the given set.

(2171, 13, 143)

- A. (4874, 17, 255)
- B. (6821, 19, 323)
- C. (1321, 11, 99)
- D. (5860, 18, 280)

3. The given question consists of three statements followed by three conclusions numbered I, II and III. Read all the conclusions and find which of the given conclusion logically follows from the given statements, if all statements are to be true.

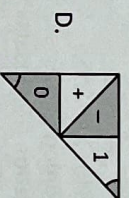
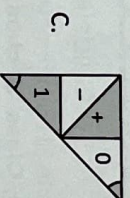
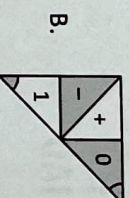
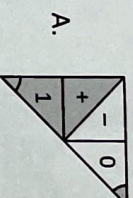
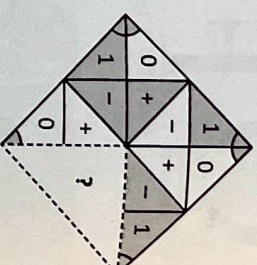
Statements:

- (i) All balls are circles.
- (ii) Some circles are ovals.
- (iii) No spheres are circles.

Conclusion:

- (I) All balls are ovals.
 - (II) Some circles are balls.
 - (III) No balls are spheres.
- A. Only II follows
 - B. Only I and III follows
 - C. Only II and III follows
 - D. Only I follows

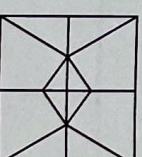
4. Which of the following figures will complete the pattern in the given figure?



5. Anjali walks 30 m straight. She then turns right and again walks 30 m. She takes three consecutive left turns and walks 30 m in each turn. Finally, she turns to her right and again walks 30 m. If she is now facing South, then in which direction was she facing initially and how far is she now from her starting point?

- A. West, $10\sqrt{2}$ m
- B. West, $30\sqrt{2}$ m
- C. North, $10\sqrt{2}$ m
- D. East, $30\sqrt{2}$ m

6. How many squares and triangles are formed respectively in the given figure?



- A. 6 and 18
- B. 6 and 17
- C. 6 and 20
- D. 5 and 14

7. Two rows of numbers are given. The resultant number in each row is to be worked out separately based on the following rules and the question below the rows of numbers is to be answered. The operation on numbers progresses from left to right.

Rules:

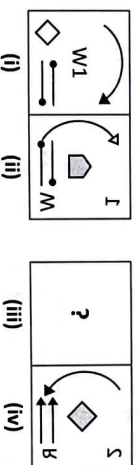
- If an even number is followed by an odd number, then they are to be added.
- If an even number is followed by another even number, then the smaller number is to be subtracted from the larger number.
- If a composite odd number is followed by a prime number, then the composite odd number is to be divided by the prime number.
- If an odd number is followed by an even number, then they are to be multiplied.

387	43	6
j	70	9

If j is the resultant of the first row, then find the resultant of the second row.

- 25
- 57
- 22
- 51

8. There is a certain relationship between figures (i) and (ii). Establish a similar relationship between figures (iii) and (iv) by selecting a suitable figure from the options that would replace the (?) in Fig. (iii).



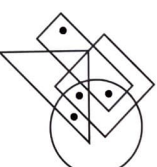
-
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9. Select the correct water image of the given combination of letters and symbols.

L@K\$H@DWE#P

- Q#EWQ@H2K@J
- T@K\$H@QWE#D
- L@K2H@DWE#b
- d#EwQ@H\$K@T

10. Select a figure from the options which does not satisfy the same conditions of placement of the dots as in the given figure.

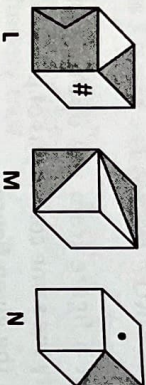
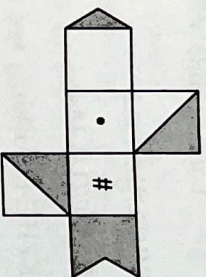


-
-
-
-

11. Seven persons J, K, L, M, N, O and P are sitting around a circle facing towards the centre of the circle. L is third to the left of N. Neither N nor L is immediate neighbour of O, who is third to the right of J. M is third to the left of K. What is the position of L with respect to P?

- Immediate left
- Second to the left
- Second to the right
- Immediate right

12. Select the box(es) that is/are similar to the box formed, when the given sheet is folded to form a cube.



- A. Only L
B. Only N
C. Only M
D. Only L and N

13. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and steps of rearrangement.

Input: ocean 75 is 70 not green 88 84

Step I : 88 ocean 75 is 70 not green 84

Step II : 88 green ocean 75 is 70 not 84

Step III : 88 green 84 ocean 75 is 70 not

Step IV : 88 green 84 is ocean 75 70 not

Step V : 88 green 84 is 75 ocean 70 not

Step VI : 88 green 84 is 75 not ocean 70

Step VII : 88 green 84 is 75 not 70 ocean

Step VII is the last step for the above input. As per the rule followed in above steps, answer the following question.

Which of the following will be the last step of rearrangement, if the input line of words and numbers is 'it must 23 better 42 59 day 90'?

- A. Step IV

16. The number of numbers greater than one million formed with the digits 0, 2, 2, 3, 3, 3, 4 is

- A. 120
B. 240
C. 360
D. 480

17. A man is employed to count ₹ 10710. He counts at the rate of ₹ 180 per minute for half an

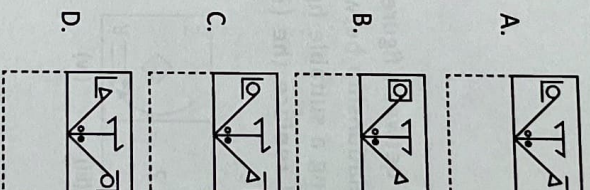
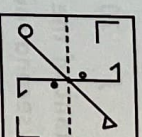
- B. Step V
C. Step VI
D. Step VII

14. How many such numbers are there in the given arrangement each of which is either followed by a symbol or preceded by a number, but not both?

16916@173A#5\$B2*6F9DX5Z96M

- A. One
B. Two
C. Three
D. More than three

15. A square transparent sheet with a pattern and a dotted line on it is shown here. Select a figure from the options as to how the pattern would appear when the transparent sheet is folded along the dotted line.



MATHEMATICAL REASONING

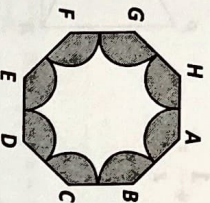
hour. After this he counts at the rate of ₹ 3 less every minute than the preceding minute. Find the time taken by him to count the entire amount.

- A. 76 mins
B. 89 mins
C. 95 mins
D. 84 mins

18. If z_1, z_2 and z_3 be unimodular complex numbers, then the maximum value of $|z_1 - z_2|^2 + |z_2 - z_3|^2 + |z_3 - z_1|^2$, is equal to

A. 6
B. 9
C. 12
D. 3

19. In the given figure, $ABCDEFGH$ is a regular octagon of side 9.8 cm and congruent sectors are formed between the octagon. Find the area of the shaded region.



A. 220.41 cm^2
B. 230.15 cm^2
C. 226.38 cm^2
D. 245.72 cm^2

20. If $b^2 - 4ac = 0, a > 0$, then the domain of the function $y = \log(ax^3 + (a + b)x^2 + (b + c)x + c)$ is

A. $R - \left\{ -\frac{b}{2a} \right\}$
B. $R - \left\{ \left[-\frac{b}{2a} \right] \cup \{x : x \geq -1\} \right\}$
C. $R - \left\{ \left[-\frac{b}{2a} \right] \cup (-\infty, -1] \right\}$
D. None of these

21. A container is in the form of a right circular cylinder surmounted by a hemisphere of the same radius 15 cm as the cylinder. If the volume of the container is $32400 \pi \text{ cm}^3$, then the height h of the container satisfies which one of the following?

A. 135 $\text{cm} < h < 150 \text{ cm}$
B. 140 $\text{cm} < h < 147 \text{ cm}$
C. 145 $\text{cm} < h < 148 \text{ cm}$
D. 139 $\text{cm} < h < 145 \text{ cm}$

22. If $A + B + C + D = 2\pi$, then $\cos A + \cos B + \cos C + \cos D =$

A. $4 \sin \frac{A+B}{2} \sin \frac{B+C}{2} \sin \frac{C+A}{2}$
B. $4 \cos \frac{A+B}{2} \cos \frac{B+C}{2} \cos \frac{C+A}{2}$

C. $1 - 4 \sin \frac{A+B}{2} \sin \frac{B+C}{2} \sin \frac{C+A}{2}$
D. $-1 - 4 \cos \frac{A+B}{2} \cos \frac{B+C}{2} \cos \frac{C+A}{2}$

23. If α, β are the zeroes of the polynomial $f(x) = x^2 - p(x + 1) - c$ such that $(\alpha + 1)(\beta + 1) = 0$, then $c =$

A. -1
B. 0
C. 1
D. 2

24. $\lim_{x \rightarrow \infty} \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$ is equal to

A. $-\frac{1}{4}$
B. $\frac{1}{2}$
C. 2
D. 1

25. $ABCD$ is a quadrilateral such that $\angle D = 90^\circ$. A circle $C(O, r)$ touches the sides AB, BC, CD and DA at P, Q, R and S respectively. If $BC = 38 \text{ cm}$, $CD = 25 \text{ cm}$ and $BP = 27 \text{ cm}$, then find the value of r .

A. 10 cm
B. 8 cm
C. 12 cm
D. 14 cm

26. If the values observed are 1, 2, 3, ..., n each with frequency 1 and n is even, then the mean deviation from mean equals to _____.

A. n
B. $n/2$
C. $n/4$
D. None of these

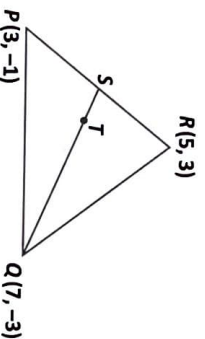
27. Find the equation of the ellipse with foci at $(\pm 5, 0)$ and $x = \frac{36}{5}$ as one of the directrices.

A. $\frac{x^2}{11} + \frac{y^2}{36} = 1$
B. $\frac{x^2}{36} + \frac{y^2}{11} = 1$
C. $\frac{x^2}{34} + \frac{y^2}{14} = 1$
D. $\frac{x^2}{14} + \frac{y^2}{34} = 1$

28. Number 1, 2, 3, ..., 100 are written down on each of the cards A, B and C. One number is selected at random from each of the cards. The probability that the numbers so selected can be the measures (in cm) of three sides of a right-angled triangle is

- A. $\frac{4}{100^3}$
 B. $\frac{3}{50^3}$
 C. $\frac{31}{100^3}$
 D. None of these

29. In the figure given below, QS is median drawn from the vertex Q on the side PR of $\triangle PQR$. T is a point on SQ , such that $ST = 1$ unit. Find the coordinates of point T .



- A. $\left(\frac{26}{11}, \frac{1}{11}\right)$
 B. $\left(\frac{23}{5}, \frac{1}{5}\right)$
 C. $\left(\frac{23}{7}, \frac{1}{7}\right)$
 D. $\left(\frac{19}{3}, \frac{1}{3}\right)$

30. The value of the expansion $(\sqrt{3} + 1)^5 + (\sqrt{3} - 1)^5$ equals

- A. $88\sqrt{3}$
 B. 40
 C. 88
 D. $40\sqrt{3}$

31. A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And, if the train were slower by 6 km/h, it would have taken 6 hours more than the scheduled time. Find the length of the journey.

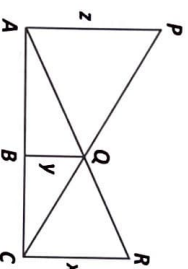
- A. 840 km

- B. 720 km
 C. 630 km
 D. 950 km

32. Number of G.P.'s having 5, 9 and 11 as its three terms is equal to

- A. Exactly two
 B. At most two
 C. At least one
 D. None of these

33. In the given figure, PA , QB and RC are perpendicular to AC . Then $\frac{1}{x} + \frac{1}{z} =$



- A. $1/5y$
 B. $1/2y$
 C. $1/y$
 D. None of these

34. Solution of $\left| \frac{1}{x} - 2 \right| < 4$ is

- A. $\left(-\infty, -\frac{1}{2}\right)$
 B. $\left(\frac{1}{6}, \infty\right)$
 C. $\left(-\frac{1}{2}, \frac{1}{6}\right)$
 D. $\left(-\infty, -\frac{1}{2}\right) \cup \left(\frac{1}{6}, \infty\right)$

35. A straight line L through the origin meets the lines $x + y = 1$ and $x + y = 3$ at P and Q respectively. Through P and Q two straight lines L_1 and L_2 are drawn, parallel to $2x - y = 5$ and $3x + y = 5$ respectively. Lines L_1 and L_2 intersect at R . Locus of R , as L varies, is

- A. $x + 3y - 5 = 0$
 B. $2x - 3y + 7 = 0$
 C. $x - 3y + 5 = 0$
 D. None of these

OR

APPLIED MATHEMATICS

16. Find coefficient of correlation between x and y , when $\Sigma x = 225$, $\Sigma y = 250$, $\Sigma(x - \bar{x})^2 = 116$, $\Sigma(y - \bar{y})^2 = 118$, $\Sigma(x - \bar{x})(y - \bar{y}) = 112$ and $n = 15$.

- A. 0.85
 B. 0.87
 C. 0.96
 D. 0.82

17. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the duration of flight.

- A. 3 hours
B. 1 hour
C. 2 hours
D. 6 hours

18. Add binary numbers 101001 and 110011 and find the obtain result in decimal system.

- A. 87
B. 92
C. 91
D. 88

19. Let $f(x) = \frac{1}{\sqrt{|x|-x}}$ and $g(x) = -\frac{1}{\sqrt{x-|x|}}$, then

- A. Domain of f and g is ϕ .
B. Domain of f is R and domain of g is ϕ .
C. Domain of f is $(-\infty, 0)$ and domain of g is ϕ .
D. Domain of f is R and domain of g is $(-\infty, 0)$.

20. The points $P(12, 8)$, $Q(-2, a)$ and $R(6, 0)$ are the vertices of a right angled triangle where $\angle R = 90^\circ$. The value of a is

- A. 5
B. -6
C. 6
D. -5

21. Consider all possible permutations of the letters of the word ENDEANOEL. The number of permutations in which letters A, E, O occur only in odd positions, is

- A. $2 \times 5!$
B. $5!$
C. $7 \times 5!$
D. $21 \times 5!$

22. Find the effective rate of interest if the nominal rate of interest is 16% p.a. and the interest is added quarterly.

- A. 16.54%
B. 16.99%
C. 17.05%
D. 17.25%

23. It is given that there is no solution to the system of equations $x + 2y = 3$, $ax + by = 4$. Which one of the following is true?

- A. a has a unique value.
B. b has a unique value.
C. a can have more than one value.
D. a has exactly two different values.

24. XY is drawn parallel to the base BC of a $\triangle ABC$ cutting AB at X and AC at Y. If $AB = 4BX$ and $YC = 2$ cm, then AY =

- A. 2 cm
B. 4 cm
C. 6 cm
D. 8 cm

25. Mr Rituraj from Mumbai has 5 kW electricity connection. He consumed 727 units of electricity in one month. Calculate his monthly bill. Tariff plan is given below.

Fixed charge is ₹ 15 per kW per month

Surcharge – 0.2 per unit, Energy tax – 5% of tariff rates

Electricity charge

Units (in kWh)	0-100	101-200	201-300	301-600	601-900	> 900
Price per unit (in ₹)	5.5	6	6.5	7	8	9

- A. ₹ 5280
B. ₹ 5351.25
C. ₹ 5382.55
D. ₹ 5385.95

26. If the 2nd, 5th and 9th terms of a non-constant A.P. are in G.P., then the common ratio of this G.P. is

- A. $\frac{7}{4}$
B. 1
C. $\frac{4}{3}$
D. $\frac{8}{5}$

27. The printed price of an article is ₹ 70000. The wholesaler allows a discount of 10% to a shopkeeper. The shopkeeper sells the article to a consumer at 4% above the marked price. If the sales are intra-state and the rate of GST is 18%, find the amount of tax (under GST) paid by the shopkeeper to the Central Government.

- A. ₹ 1764
B. ₹ 882
C. ₹ 6552
D. ₹ 13104

28. Evaluate : $\frac{1}{4}(\cot^4 30^\circ - \operatorname{cosec}^4 60^\circ)$

$+\frac{3}{2}(\sec^2 45^\circ - \tan^2 30^\circ) - 5 \cos^2 60^\circ.$

- A. 0
B. $\frac{11}{6}$
C. $\frac{7}{4}$
D. $\frac{55}{18}$

29. The test marks of 20 students out of 10 are given below:

Test marks	1	2	3	4	5	6	7	8	9	10
Number. of students	1	3	1	2	2	3	5	2	1	0

Find the percentile rank of test marks 6.

- A. 50.25
B. 52.50
C. 55.25
D. 51.25

30. Two men standing on opposite sides of a flagstaff measure the angles of elevation of the top of the flagstaff as 30° and 60° . If the height of the flagstaff is 20 m, then the distance between the men is (Use $\sqrt{3} = 1.732$)

- A. 46.19 m
B. 40 m
C. 26.14 m
D. None of these

31. A crime is committed by one of two suspects, A and B. Initially, there is equal evidence against both of them. In further investigation at the crime scene, it is found that the guilty party had a blood type found in 20% of the population. If the suspect A does match this blood type, whereas the blood type of suspect B is unknown, then the probability that A is the guilty party is
- A. $\frac{3}{5}$

36. Five boys and three girls are sitting in a row of eight seats. In how many ways can they be seated so that not all girls sit side by side?

- A. 36000
B. 45000
C. 24000
D. 32000

- B. $\frac{5}{6}$
C. $\frac{1}{3}$
D. $\frac{2}{3}$

32. The reciprocal of the value of

$\lim_{n \rightarrow \infty} \left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \left(1 - \frac{1}{4^2}\right) \dots \left(1 - \frac{1}{n^2}\right)$ is _____.

- A. $\frac{1}{3}$
B. $\frac{1}{2}$
C. 3
D. 2

33. A storage tank consists of a circular cylinder with a hemisphere adjoined on one side. If the external diameter of the cylinder be 14 m and its length be 50 m, then what will be the cost of painting the tank outside at the rate of ₹ 10 per sq. m?

- A. ₹ 16820
B. ₹ 26180
C. ₹ 25080
D. None of these

34. If mode of the following data is 65 and frequencies of p is

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	6	8	p	12	6	5

- A. 7
B. 8
C. 9
D. 10

35. A man borrowed some money to repay in three equal annual installments of ₹ 9,261 each at 5% p.a. compound interest. Find out what sum of money had he borrowed.

- A. ₹ 24225
B. ₹ 25325
C. ₹ 25220
D. ₹ 22220

37. A person invests money in three different schemes for 4 years, 6 years and 12 years at 6%, 8% and 5% respectively. At the completion of the duration of each scheme, he gets the equal profits. Find the ratio of his investment.

- A. 5 : 10 : 4
B. 4 : 5 : 10

EVERYDAY MATHEMATICS

- C. 5 : 4 : 10
D. 10 : 5 : 4

38. The cost of an article (which is composed of raw materials and wages) was 3 times the value of the raw materials used. The cost of raw materials increased in the ratio 3 : 7 and wages increased in the ratio 4 : 9. Find the present cost of the article if its original cost was ₹ 18.

- A. ₹ 41
B. ₹ 30
C. ₹ 40
D. None of these

39. A man repays a loan of ₹ 3250 by paying ₹ 20 in the first month and then increases the payment by ₹ 15 every month. How long will it take him to clear the loan?

- A. 20 months
B. 25 months
C. 19 months
D. 15 months

40. Two students Anil and Ashima appeared in an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that only one of them will qualify the examination.

- A. 0.11
B. 0.10
C. 0.12
D. 0.13

41. 4 men and 6 women can complete a work in 8 days, while 3 men and 7 women can complete it in 10 days. In how many days will 10 women complete it?

- A. 35
B. 40
C. 45
D. 50

42. A college has raised 75% of the amount it needs for a new building by receiving an average donation of ₹ 600 from the people already solicited. The people already solicited represent 60% of the people the college will ask for donations. If the college is to raise exactly 25% of the amount needed for the new building, what should be the average donation from the remaining people to be solicited?

- A. ₹ 300
B. ₹ 250
C. ₹ 400
D. ₹ 500

43. Ganesh has to pay ₹ 482 for 19 apples and 11 guavas. If he would have exchanged the number of apples and guavas purchased, then he would have paid ₹ 64 less. Find how much more amount he has to pay to purchase 1 apple than 1 guava?

- A. ₹ 19
B. ₹ 8
C. ₹ 11
D. ₹ 7

44. Two trains start from P and Q respectively and travel towards each other at a speed of 50 km/hr and 40 km/hr respectively. By the time they meet, the first train has travelled 100 km more than the second train. The distance between P and Q is

- A. 500 km
B. 630 km
C. 900 km
D. None of these

45. A manufacturer has 200 litres of acid solution which has 15% acid content. How many litres of acid solution with 30% acid content may be added so that acid content in the resulting mixture will be more than 20% but less than 25%?

- A. More than 100 litres but less than 300 litres.
B. More than 120 litres but less than 400 litres.
C. More than 100 litres but less than 400 litres.
D. More than 150 litres but less than 600 litres.

ACHIEVERS SECTION

46. Read the given statements carefully and select the correct option.

Statement-I : The letters of the word COCHIN are permuted and all the permutations are arranged in an alphabetical order as in an English dictionary. The number of words that appear before the word COCHIN is 96.

Statement-II : The number of ways in which five different rings can be worn in four fingers with atleast one ring in each finger is 120.

- A. Both Statement-I and statement-II are true.
B. Both Statement-I and Statement-II are false.
C. Statement-I is true but Statement-II is false.
D. Statement-I is false but Statement-II is true.

47. Evaluate :

- (i) $\lim_{x \rightarrow 1} \frac{x^{1/4} - x^{1/5}}{x^3 - 1} =$ (ii) $\lim_{x \rightarrow 2} \frac{2^x + 2^{3-x} - 6}{\sqrt{2-x} - 2^{1-x}} =$
- (i) (ii)
- A. 60 2
- B. 30 4
- C. $\frac{1}{60}$ 8
- D. $\frac{1}{30}$ 1

48. Read the statements carefully and state T for true and F for false.

- (i) The sum of infinite terms of a G.P. is 20 and the sum of their squares is 100. Then the common ratio of G.P. is $\frac{2}{5}$.
- (ii) If x, y and z are $p^{\text{th}}, q^{\text{th}}$ and r^{th} terms respectively of an A.P. and also of a G.P., then $x^{q-r} y^{r-x} z^{x-y}$ is equal to -1 .
- (iii) If 2, 7, 9 and 5 are subtracted respectively from four numbers forming a G.P., the resulting numbers are in A.P., then the smallest of the four numbers is -24 .

- | | | |
|------|------|-------|
| (i) | (ii) | (iii) |
| A. F | T | F |
| B. F | T | T |
| C. F | F | T |
| D. T | F | F |

SPACE FOR ROUGH WORK

49. Which of the following statements is correct?

- A. If the vertices of a ΔPQR are $P(2, 1), Q(-2, 3)$ and $R(4, 5)$, then the equation of the median through the vertex R is $3x - 4y + 8 = 0$.
- B. The point $P(a, b)$ lies on the straight line $3x + 2y = 13$ and the point $Q(b, a)$ lies on the straight line $4x - y = 5$, then the equation of line PQ is $x - y = 5$.

- C. The line L given by $\frac{x}{5} + \frac{y}{b} = 1$ passes through the point $(13, 32)$. The line K is parallel to L and has the equation $\frac{x}{c} + \frac{y}{3} = 1$, then the distance between L and K , is $\frac{17}{\sqrt{23}}$.

- D. None of these

50. Fill in the blanks and select the correct option.

- (i) Let R be a relation from the set $\{1, 2, 3, \dots, 60\}$ to itself such that $R = \{(a, b) : b = pq, \text{ where } p, q \geq 3 \text{ are prime numbers}\}$. Then, the number of elements in R is _____.
- (ii) Let $f(x) = ax^2 + bx + c$ be such that $f(1) = 3$, $f(-2) = \lambda$ and $f(3) = 4$. If $f(0) + f(1) + f(-2) + f(3) = 14$, then λ is equal to _____.

- | | |
|--------|----------------|
| (i) | (ii) |
| A. 660 | 4 |
| B. 540 | -4 |
| C. 660 | $\frac{13}{2}$ |
| D. 600 | $\frac{23}{2}$ |