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SSC-JE

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A word to the students

Er. R.K. Rajesh
(DIRECTOR)

Knowledge of Reasoning & General Aptitude is very important to score good marks into examinations like SSC-JE, Public sector undertakings & many promising and prestigious competitions. Preparation for Reasoning & General Aptitude can't be underestimate as it is compulsory to qualify for many exams; this may contribute your score upto top ranks with final selections. You need to plan your study as per recent examination pattern, which help you to understand the core area to focus in more details. This book will definitely help an average student to understand the basic fundamentals and improve their strategies to attempt questions related to Reasoning & General Aptitude section.

In my opinion, syllabus is quite large in Reasoning & General Aptitude, so selective preparations with thorough understanding of concepts are very important. Practice of quality questions is best way to deal & qualify such exams. Competitive examinations rigorously tests candidates' overall knowledge & understanding of concepts, ability to apply their knowledge and personality level by screening them through various stages. A candidate is supposed to smartly deal with the syllabus not just mugging up concepts. Thorough understanding with critical analysis of topics and ability to express clearly are some of the pre-requisites to crack this exam. The syllabus and questioning pattern has remained pretty much the same over the years.

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CONTENT

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DIAGNOSTIC TEST

1. Three exist a cube *x* to each face of which an identified cube in attached. What is the percentage increase in the total surface area?
(*a*) 400% (*b*) 500% (*c*) 600% (*d*) 800%

2. Find the missing number '*x*'

4	7
6	2

8	9
9	1

1	5
3	5

1	6
2	*x*

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

3. If CAR is 22, SCOOTER?
(*a*) 33 (*b*) 11 (*c*) 44 (*d*) 95

4. If the length of the sides of a triangle are 5 and 9 respectively, which of the following could be the length of the third side of the triangle?
(*a*) 3 (*b*) 15 (*c*) 8 (*d*) 14

5. In how many ways a committee, consisting of 5 men and 6 women can be formed from a class of 8 men and 10 women.
(*a*) 266 (*b*) 5040 (*c*) 11760 (*d*) 86400

Direction for question 6 to 8

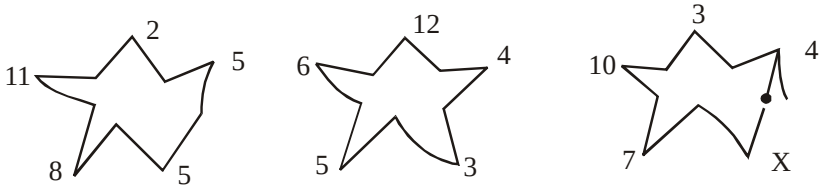
There question are based on following information in A class of 150 students, 50 students passed in mathematics; 40 students failed only in chemistry and 20 students failed in both the subjects.

6. How many students passed in both the subjects?
(*a*) 20 (*b*) 15 (*c*) 10 (*d*) 16

7. How many students passed in one subject?
(*a*) 25 (*b*) 120 (*c*) 140 (*d*) 145

8. How many students failed in at least one of the subjects?
(*a*) 130 (*b*) 125 (*c*) 145 (*d*) 140

9. Find *X*



(*a*) 2 (*b*) 3 (*c*) 5 (*d*) 1

10. A man said to a Lady "your mothers husband S sister is my aunt.'' How is the lady related to the man?
(*a*) Daughter (*b*) Grand daughter (*c*) Mother (*d*) Sister

11. A, B, C, D and E are sitting on a bench. A in sitting next to B, C is sitting next to D. D is not sitting with E who is one the left end of the bench C in the second position from the right A. A is right of B and E. A and C are sitting together in which position A is sitting.

(*a*) between B and D (*b*) between B and C

(*c*) between E and D (*d*) between C and E

Direction 12 – 13

All the faces of a cube are painted with blue color, then it is cut into 125 small equal cubes.

12. How many cubes will be formed having only one face colored?

(*a*) 54 (*b*) 8 (*c*) 16 (*d*) 24

13. How many cubes will be formed having no face coloured?

(*a*) 127 (*b*) 18 (*c*) 16 (*d*) 27

14. Three pipes A, B and C can fill A tank from empty to full in 30 minutes, 20 minutes, and 10 minutes respectively. When the tank in empty, all the three pipes are open A, B and C discharges chemicals P, Q and R respectively. What is the proposition of the solution R in the liquid in the tank after 3 minutes?

(*a*) $\frac{5}{11}$ (*b*) $\frac{6}{11}$ (*c*) $\frac{7}{11}$ (*d*) $\frac{8}{11}$

15. Seats of mathematics, physics and biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 79% respectively. What will be the ratio of the increased seats?

(*a*) 2 : 3 : 4 (*b*) 6 : 7 : 8 (*c*) 6 : 8 : 9 (*d*) None of these

16. Which in the odd one out?

(*a*) II (*b*) V (*c*) III (*d*) VII

17. A train passes A station platform in 36 seconds, and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr. What is the length of the platform?

(*a*) 120 m (*b*) 240 m (*c*) 300 m (*d*) None of these

18. The angle between the minute hand and the hour hand of the clock when the time in 4:20 is?

(*a*) 0º (*b*) 10º (*c*) 15º (*d*) 20º

19. What will be the last digit of the number obtained by multiplying 17^{90} and 19^{76}?

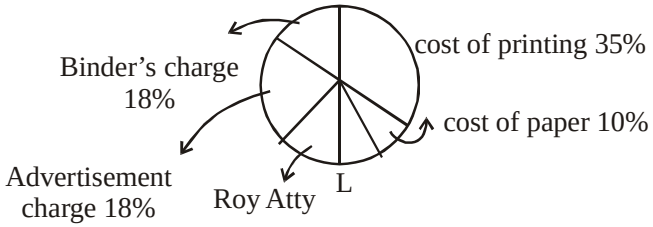
(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 9

20. Shashi is taller than the Samir but not as tall as Samir. Who among them is the tallest?

(*a*) Ashok (*b*) Shishar (*c*) Praboth (*d*) Prakash

Directions 21 to 24

Study the pie chart and answer the question given below it.



21. If the miscellaneous charge are 6000 Rs. The advertisement charge are
(*a*) Rs. 90000 (*b*) Rs. 1333.33 (*c*) Rs. 2700 (*d*) Rs. 12,000

22. If the cost of printing is Rs. 17,900. The Royalty is
(*a*) Rs. 8750 (*b*) Rs. 7500 (*c*) Rs. 3190 (*d*) Rs. 6300

23. The central angle of cost of printing in more than that of advertisement changes by
(*a*) 72º (*b*) 61.2º (*c*) 60º (*d*) 54.8º

24. What should be the central angle of the sector for the cost of the paper?
(*a*) 22.9º (*b*) 16º (*c*) 54.8º (*d*) 36º

25. If A's monthly income is 40% more than that of B. How much percentage of B's income less than that of A?
(*a*) 20% (*b*) 28% (*c*) $28\frac{4}{7}\%$ (*d*) None of these

26. An express train 'A' from Ahmedabad to Chennai leaves Ahmedabad 6 : 30 a.m. and travels at 50 km/hr towards Baroda situated 100 km. away At 7.00 a.m. Another express train B leaves Baroda towards Ahmedabad and travels at 40 km/hr, at 7.30 a.m. Mr. *X* the traffic controller at Baroda that both the trains are running on the same track.
How much time does he have to avert a head on collision between the two trains?
(*a*) 15 min (*b*) 20 min (*c*) 25 min (*d*) 30 min

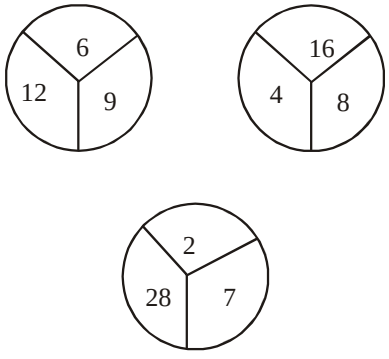
27. If a operation, $\wedge$ is defined by the equation $x \wedge y = 2x + y$, what is the value of *a* in $P(A) = 1 - \frac{5}{13} = \frac{8}{13}$
(*a*) 0 (*b*) 1 (*c*) –1 (*d*) 4

28. If was calculated that 75 men could complete a piece of work in 20 days. When work was scheduled to commence, it was found necessary to send 25 men to another project. How much longer will it take to complete the work?

29. A dishonest shopkeeper professes to sell pulses at the cost price, but he uses a false weight of 950 gm. for a kg. His gain is ……. %

30. $\left(\frac{1}{10}\right)^{18} - \left(\frac{1}{10}\right)^{20} = ?$
(*a*) $\frac{99}{10^{20}}$ (*b*) $\frac{99}{10}$ (*c*) 0.9 (*d*) None of these

31. What number should replace the question mark?

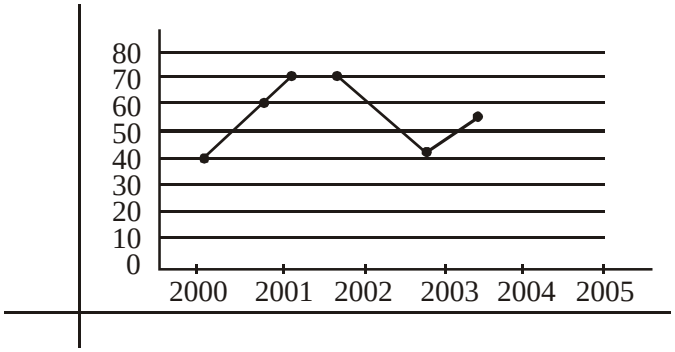


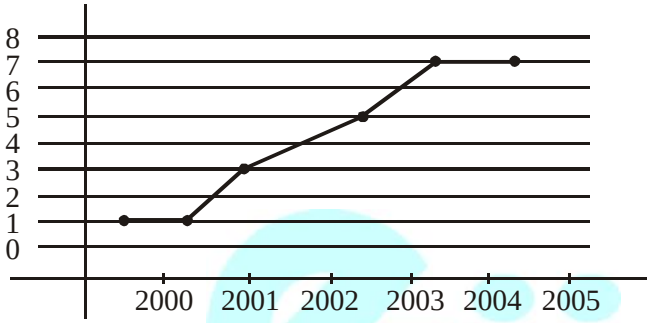
32. The cost of making a robot consists of material cost, repairing cost, coloring cost and is in the ratio 3 : 4 : 5. If the material cost is 1200, then find out the cost of the robot.

33. Directions for question :

Study the given line graphs carefully and answer the questions given below. The line graphs below provide the GDP and the percentage of GDP spent on education for the years 2000 to 2005. Study the graphs and answer the questions that follow.

GDP in Rs. '000 crore'





Percentage of GDP spent on education

Among the given years, both inclusive, what percentage of the country's total GDP has gone into education?

(*a*) 4.3% (*b*) 3.6% (*c*) 3.4% (*d*) 3.1%

34. The total amount given to education would be how many times the total amount given to defence if every year 2% of the GDP is given to defence (for the entire period)?

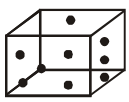
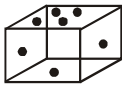
(*a*) 2.15 times (*b*) 1.7 times (*c*) 1.55 times (*d*) 1.8 times

35. If due to an HR ministry report. It is obligatory for the government to allocate. At least Rs. 3,200 crore for education in 2006, provided educational spending as a percentage of the GDP, does not exceed 6.5%, then what is the least desirable GDP for 2006(in Rs. '000' crore)

(*a*) 51.52 thousands crore (*b*) 48.24 thousands crore

(*c*) 49.23 thousands crore (*d*) 42.72 thousands crore

36. Two positions of a dice are shown below. When there are two dots at the bottom. The number of dots at the top will be

(*a*) 2 (*b*) 3 (*c*) 5 (*d*) 6

37. There are 200 questions on a 3 hr examination. Among these questions are 50 mathematics problems. It is suggested that twice as much time be spent on each maths problem as for each other question. How many minutes should be spent on mathematics problem

(*a*) 36 (*b*) 72 (*c*) 60 (*d*) 100

38. What is a percent of b divided by b percent of a?
(a) a (b) b (c) 1 (d) 10

39. Daal is now being sold at Rs. 20 per kg. During a last month its rate was Rs. 16 per kg. By how much percent should a family reduce its consumption so as to keep the expenditure fixed?

40. A person bought a certain number of oranges for Rs 70. If the price of each orange was Rs 2 less, he would have bought 4 more oranges for the same amount. What is the number of oranges, he bought originally?
(a) 12 (b) 10 (c) 18 (d) 15

41. A coin is tossed 5 times. What is the probability that head appears an odd number of times?
(a) $\frac{2}{5}$ (b) $\frac{1}{2}$ (c) $\frac{1}{5}$ (d) $\frac{4}{25}$

42. A natural number's a is given in base 10. The number 'a' can be written as 212 in base b and 128 in base. 'b + 2'. The value of (a + b) in base 10 is
(a) 219 (b) 125 (c) 114 (d) 107

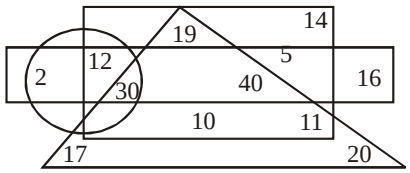
43. There are 5 Red shoes, 4 green shoes. If one draw randomly a shoe what is the probability of getting a red shoe.

44. If a light flashes every 6 seconds, how many times will it flash in $\frac{3}{4}$ of an hour?

45. If point P is on line segment AB, then which of the following is always true?
(a) AP = PB (b) AP > PB (c) PB > AP (d) AB > AP

Durations for questions (46-47)

In the diagram given below the triangle represents people who enjoy singing while the square represents people who enjoy singing, the rectangle represents people who like painting, the circle presents people who like driving. Answer the question based on the following diagram. The figures written in the diagram show the number of persons belonging to that category.

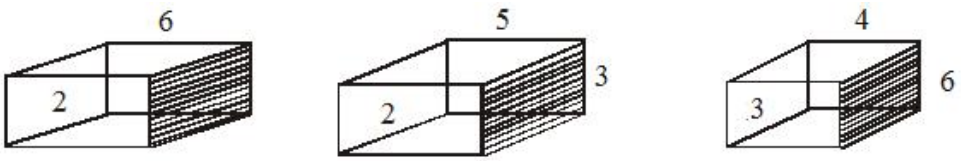


46. How many people like both Dancing and Singing but not driving.
(a) 12 (b) 30 (c) 42 (d) None of these

47. How many people like painting and driving.
(a) 12 (b) 45 (c) 43 (d) 70

48. The length of the side of a square is represented by (x + 2). The length of the side of an equilateral triangle is 2x. If the square and the quadrilateral triangle have equal perimeter, then the value of x is ……..

49. The following figure depicts three views of a cube. Based on this answer 49 – 51



The number on the face opposite to the face carrying 1 is …….

50. The number of faces adjacent to the face marked 5 are …….

51. Which of the following pairs does not correctly give the numbers on the opposite faces
(*a*) 6, 5 (*b*) 4, 1 (*c*) 4, 1 (*d*) 1, 3

52. If $\log_5 \log_3 (\sqrt{x+3} + \sqrt{x}) = 0$. Then what is the value of x ?
(*a*) $x = 1$ (*b*) $x = 2$ (*c*) $x = 3$ (*d*) $x = 4$

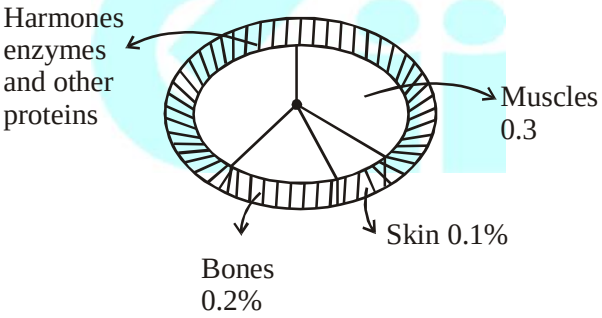
53. Find the last two digits of 87^{474}
(*a*) 79 (*b*) 69 (*c*) 89 (*d*) 29

54. The score card of Sachin in one day match is shown in the table below

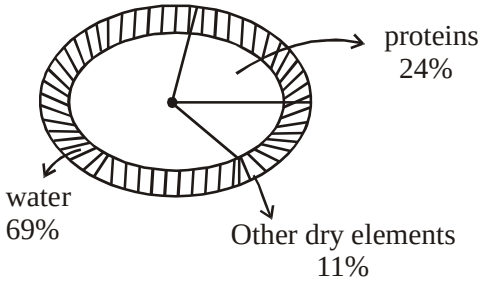
Runs	Balls	4's	6's	Strike rate
57	79	6	0	72.15

All runs scored are in singles doubles, threes, fours and sixes; No extras
Strike rate = No. of runs score? No. of balls faced the minimum strike rate Sachin would have had after facing 70 balls or deliveries.
(*a*) 40.00% (*b*) 57.82% (*c*) 34.28% (*d*) 45.2%

55. Study the following pie chart carefully and answer the question that follow. The following pie charts give the information about the distribution of weight in the human body according to different kinds of components.



Fraction wires distribution of weight among harmones Muscles, Skin and Bones



Percentage distribution of weight in human body

How much percentage of the human body is neither made of bones nor skin?
(*a*) 40% (*b*) 60% (*c*) 50% (*d*) 70%

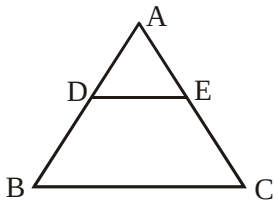
56. What is the ratio of the distribution of Proteins in the muscles to that of the distribution of Proteins in the bones?
(*a*) 2 : 1 (*b*) 2 : 3 (*c*) 3 : 2 (*d*) cannot be determined

57. What percentage of proteins of the human body is equivalent to the weight of its skin?
(*a*) 41.66% (*b*) 43.33% (*c*) 44.44% (*d*) cannot be determined

58. Two identical circles intersect so that their centers, and the points at which they intersect, from a square of side 1 cm. The area in sq. cm of the portion that is common to the two circles is

(*a*) $\frac{\pi}{4}$ (*b*) $\frac{\pi}{2}-1$ (*c*) $\frac{\pi}{5}$ (*d*) $\sqrt{2}-1$

59. In ΔABC, $DE \parallel BC$ and the area of the quadrilaterals DBCE = 45 sq. cm. If AD : DB = 1 : 3, then find the area of ΔADE



(*a*) 2 sq. cm (*b*) 3 sq. cm (*c*) 5 sq. cm (*d*) 6 sq. cm

60. How many minutes is it before 12 noon if 8 minutes ago it was three times as many minutes past 9 a.m.?

ANSWER KEY

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	**b**	**d**	**c**	**c**	**c**	**b**	**d**	**c**	**d**
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
b	**a**	**a**	**b**	**a**	**b**	**b**	**b**	**d**	**d**
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
c	**b**	**b**	**d**	**c**	**b**	**b**	**30 days**	**5.3%**	$\frac{99}{10^{20}}$
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
7	**12**	**b**	**d**	**c**	**b**	**a**	**c**	**c**	**b**
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
c	**c**	$\frac{^5C_1}{^9C_1}$	**450 times**	**d**	**d**	**d**	***x* = 4**	**5**	**1, 2, 3 & 4**
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
B	**B**	**C**	**C**	**D**	**d**	**a**	**b**	**b**	**11.09**

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SOLUTIONS

1. **(*a*)** A cube has 6 faces
We need to 6 faces by 6 identical cubes each cube while covering boxes. The surface area of 2 faces. Hence, 6 cubes after covering loses $6 \times 2 = 12$ faces.
Now, there are total number of seven cubes $7 \times 6 = 42$ (faces) with a loss of 12 faces (42 – 12 = 30 faces)
$\Rightarrow$ The area of the 30 faces in the new surface area

$$\% \text{ increase} = \frac{\text{Area(30 faces)} - \text{Area(6 faces)}}{\text{Area(6 faces)}} \times 100$$

$$= \frac{24}{6} \times 100 = 400\%$$

2. **(*b*)** Upper and lower multiplied to give the two digits middle written separately

$$6 \times 2 = \boxed{1} \quad \boxed{2}$$

↑ Ans

3. **(*d*)** Add the corresponding position of the alphabet in the given word

C A R
↑ ↑ ↑
3 + 1 + 18 = 22

Similarly SCOOTER
19 + 3 + 15 + 15 + 20 + 5 + 18 = 95

4. **(*c*)** If l is the length of the sides of a triangle. Then use have the inequality
Difference of the length of two two other sides $\leq l \leq$ Sum of the length of the two other sides

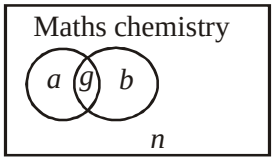
$$(9 - 5) \leq l \leq (9 + 5)$$

$$\Rightarrow \quad 4 \leq l \leq 13$$

Here only option (*c*) lies in the interval.

5. **(*c*)** Required number of ways = $^{8}C_5 \times {}^{10}C_6 = 11760$

(6 – 8) Venn Diagram



Given $a + g = 50$
The number of students who failed only in chemistry = $a = 40$ $\Rightarrow$ $g = 10$
Also $n = 20$
$b = 190 - (40 + 10 + 20) = 80$

6. **(*c*)** The number of students who passed in both the subjects $g = 10$

7. **(*b*)** The number of students who passed exactly in one subject
$a + b = 40 + 80 = 120$

8. **(*d*)** The number of students who failed in at least one subject
$= a + b + n = 40 + 80 + 20 = 140$
= Total – g = 140
= 150 – 10 = 140

9. **(*c*)** $\frac{11-5}{8-5}=2$ Hence $\frac{10-4}{7-x}=3$

Similarly $\frac{6-4}{5-3}=1$ $\Rightarrow$ $x = 5$

10. **(*d*)** Sister

11. **(*b*)** Deduce from the given arrangement the following

$\overset{\bullet}{E}\ \overset{\bullet}{B}\ \overset{\bullet}{A}\ \overset{\bullet}{C}\ \overset{\bullet}{D}$

$\therefore$ A is sitting between B and C

12. **(*a*)** One side of the big cube = $\sqrt[3]{125}=5$

Number of small cubes having only one face colored

$=(5-2)^2\times 6=9\times 6=54$

13. **(*a*)** Number of small cubes having no face colored

$=(5-2)^2=27$

14. **(*b*)** Part filled by (A + B + C) in 3 min

$=3\left(\frac{1}{30}+\frac{1}{20}+\frac{1}{10}\right)=3\times\frac{11}{60}=\frac{11}{20}$

Part filled by C in 3 min = $\frac{3}{10}$

$\therefore$ Required ratio = $\frac{3}{10}\times\frac{20}{11}=\frac{6}{11}$

15. **(*a*)** Originally let the number of seats for mathematics, Physics and Biology be $9x$, $7x$ and $8x$ respectively

Number of increased seats are 140% of $9x$, 190% of $7x$ and 175% of $8x$.

New ratio = $\frac{140}{100}\times 9x:\frac{190}{10}\times 7x:\frac{175}{100}\times 8x$

$=x:\frac{3x}{2}:2x = 2x : 3x : 4x = 2 : 3 : 4$

16. **(*b*)** I is same face as VII but smile/sad similarly II is same as III and IV and VI odd in V.

17. **(*b*)** Speed = $54\times\frac{5}{18}$ m/ sec $=15$ m/ sec

Length of the train = (15 × 20)m = 300 m

Let the length of the platform be × *m*

Then $\frac{x+300}{36}=15$

$\Rightarrow$ $x + 300 = 540$ or $x = 240$ m

18. **(*b*)** Angle traced by hour hand in $\left(4+\frac{20}{60}\right)$hrs.

$=\left(\frac{13}{3}+\frac{360}{12}\right)^{\circ}=130^{o}$

Angle traced by min hands in 20 min $=\left(\frac{360}{60}\times 20\right)^{\circ}=120^{o}$

Required angle = $130 - 120 = 10^{o}$

19. **(*d*)** Let us see the respective pattern in 17's multiplied in the last digit.

	Last digit
17	7
17^2	9
17^3	3
17^4	1
17^5	1

$\Rightarrow$ After every 4 repetations (of 7, 9, 3 and 1) the pattern is formed

Hence 17^{50} can be found as $4 \times 12 + 2$ $\Rightarrow$ 9 will be last digit.

Similarly for 19 we have

	Last digit
19	9
19^2	1
19^3	9

$\Rightarrow$ After every 2 repetations the pattern is formed.

Hence 19^{76} can be formed as $2 \times 38 + 0 \Rightarrow \boxed{1}$ will be the last digit.

Hence the last digit of the product $17^{50} \times 19^{76}$ is $9 \times 1 = 9$ option (*d*)

20. **(*d*)** Prakash > Shissher > Samir …(*i*)

Samir > Ashok > Prabodh …(*ii*)

From (*i*) and (*ii*)

Prakash > Shissher > Samir > Ashok > Prabodh

21. **(*c*)** Advance charge

$$= \frac{18}{4} \times 6000 = 27,000$$

22. **(*b*)** Royalty = $\frac{15}{35} \times 17,500 = \text{Rs.}\,7500$

23. **(*b*)** Central angle of the cost of printing = $\frac{35}{100} \times 360$

Central angle of the advertisement charges = $\frac{80}{100} \times 360$

$\therefore$ Difference = $\left(\frac{(35-18)}{100} \times 360\right)^{\circ} = \left(\frac{17}{100} \times 360\right)^{\circ} = 61.2^{\circ}$

24. **(*d*)** Central angle of the sector for the cost of the paper

$$= \frac{10}{100} \times 360 = 360$$

25. **(*c*)** Required percentage

$$= \left[\frac{40}{(40+100)} \times 100\right]\% = 28\frac{4}{7}\%$$

26. **(*b*)** At 7.30 A.M. 'A' express is at 50 km/hr. from Ahmedabad. At the same time 'B' express is at 20 km from Baroda. Hence distance between the trains at 7.30 A.M. is 30 km.

Relative speed = 50 + 40 = 90 km/hr.

28. One day work = $\frac{1}{20}$

One man's one day work = $\frac{1}{20\times 75}$

The total number's workers = 50

One day work = $\frac{50\times 1}{20\times 75}$

Total number of days required to complete the work = $\frac{75\times 20}{50}=30$

29. He sells 250 grams of pulses and gains 50 grams.
If he sells 100 grams of pulses. Then he will gain

$$\frac{50}{950}\times 100 = 5.26\% = 5.3\%$$

30. $$\frac{1}{10^{18}}-\frac{1}{10^{20}}=\frac{1}{10^{18}}\left[\frac{1}{1}-\frac{1}{100}\right]$$

$$=\frac{1}{10^{18}}\times\frac{99}{100}=\frac{99}{10^{20}}$$

31. 7 Answer

$2 \times 28 = 56$

$$\frac{56}{8}=7$$

32. Simple 3 part is 1200 so 3 + 4 + 5 = 12

33. **(*b*)** $\frac{10.5}{290}\times 100 = 3.6\%$

34. **(*d*)** Country GDP that has gone into defence
= 2% of 290000 crore = 5.8 thousands crore

Let $10.5 = k \times 5.8$

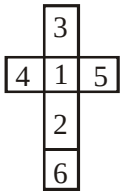
$K = 1.8$

35. **(*c*)** GDP for educational spending as a percentage of GDP(in 2006) must not exceed 6.5%
= Rs. 3200 crore

$\therefore$ 6.5% of (GDP in 2006) = Rs. 3200 crore

$\therefore$ GDP in 2006 = $\frac{3200\times 100}{6.5}$ = 49.23 Thousands crore

36. **(*b*)** From the figure. It is clear that number 3 will be opposite to number 2.



37. **(*a*)** Let x be the time spent is non math
Problems and y time spent is non math

Given $150x + 50y = 3 \times 60 = 180$ min

or $19x + 5y = 18$ …(*i*)

Also $2x = y$ …(*ii*)

Solving (*i*) or (*ii*) we have

$15x + 10x = 18$

$$x = \frac{18}{25}$$

$\therefore$ Total min spent in math problems $= \frac{18}{25} \times 50 = 36\,\text{min}$

38. **(*c*)** A percent of $b : \frac{a}{100} \times b$

b percent of $a : \frac{b}{100} \times a$

a percent of b divided by b percent of a

$$\frac{\frac{a}{100} \times b}{\frac{b}{100} \times a} = 1$$

39. **(*c*)** Let the have the consumption last month = C

This month = C′

And expenditure (Last and current month) = $\in$ (same)

$\in = 16\text{C}$ and $\in = 20\text{C}'$

equating $\text{C}' = \frac{16\text{C}}{2} = \frac{4\text{C}}{5}$

$\therefore$ % change in consumption

$$= \frac{\left(\text{C} - \frac{4\text{C}}{5}\right)}{\text{C}} \times 100\% = 20\% \text{ reduction}$$

40. **(*b*)** Assume that the person bought x oranges for Rs. 70.

Hence price of each orange is $\frac{70}{x}$. If he bought 4 more oranges for Rs. 70. The price of each orange would be $\frac{70}{x+4}$ which is 2 less than $\frac{70}{x}$

Hence $\frac{70}{x+4} = \frac{70}{x} - 2 \quad \Rightarrow \quad \frac{70}{x} - \frac{70}{x+4} = 2$

$$x^2 + 4x - 140 = 0$$

Hence $x = -14$ or $x = 10$

41. **(*c*)** The possible outcomes are as follows

5H, 5T, (H, 4T), (T, 4H), (2H, 3T), (3H, 2T)

6 outcomes at all

Therefore, the probability that head appears an odd number of times $= \frac{3}{6} = \frac{1}{2}$ only

Three outcomes out of six outcomes, Head

Appears an odd number of time.

42. **(*c*)** $(212)_b = (128)_{b-2}$

$$2b^2 + b + 2 = (b+2)^2 + 2(b+2) + 8$$

$\Rightarrow$ $b^2 - 5b - 14 = 0$

$b = 7$

$\therefore$ $a = (212)_7 = 2 \times 7^2 + 1 \times 7^1 + 2 \times 7^0 = 107$

$\therefore \quad (a + b) = 107 + 7 = 114$

43. $\frac{^5C_1}{^9C_1}$

44. There are 60 min in an hour

In $\frac{3}{4}$ of an hour there are $\left(60 \times \frac{3}{4}\right)$min = 45 min

In $\frac{3}{4}$ of an hour there are (60 × 45) seconds = 2700 seconds

Light flashed for every 6 seconds in 2700 seconds $\frac{2700}{6}$ = 450 times

The count start the first flash. The light will flashes 451 times in $\frac{3}{4}$ of an hour.

45. **(*d*)** A $\underset{\text{P}}{\text{———}}$ B

Since P is a point on the line segment AB AB > AP

46. **(*d*)** From the figure we can say that there are 12 people belonging to in such category.

47. **(*d*)** From the figure we can say that there are 70 people who like painting and driving.

48. Since the side of the square is $x + 2$ is perimeter = $4(x + 2) = 4x + 8$

Since the side of the equilateral triangle is $2x$

Its perimeter = $3 \times 2x = 6$

Also, the perimeter of both are equal

$4x + 8 = 6x$

$2x = 8$

$x = 4$

49. 5

50. 1, 2, 3 and 4

51. **(*b*)**

52. **(*b*)** Given $| x - | x - 2 | | = 6$

When $x < 2$

$| x - 2 | = - (x - 2)$

$| x - (x - 2) | = 6 \qquad 2x - 2$

$x - 1 = \pm 3$

$x = 4$ or -2

Since $x < 2$ so $x = -2$ is the only solution.

When $x > 2$. Then solution (equation) is not true.

53. **(*c*)** $87^{474} = 87^{472} \times 87^2$

$= (87^4)^{118} \times (87)^2 = (69 \times 69)^{118} \times 69$

The last two digits of 87^2 are 691 = $61^{118} \times 69$

$= 81 \times 89 = 89$

54. **(*c*)** Since minimum strike rate is to be calculated worst care scenario is taken into account.

Maximum runs he scored in the last 9 balls.

$4 \times 6 + 3 \times 3 = 33$ runs

Therefore remaining 24 runs were scored in 70 balls in other words. He was to score

At least 57 runs in 79 balls.

The minimum strike rate = $\frac{24}{70} = 34.28\%$

55. **(*d*)** Assume total weight to be 100 kg. Then

Total weight of bones = $.2 \times 100 = 20$ kg

Total weight of skin = .1 × 100 = 20 kg
Total weight of body = 100 kg
So, the required percentage is 70%

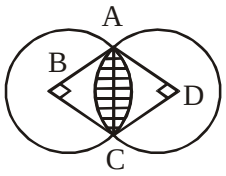
56. **(*d*)** Since we do not know how much protein is contributing in muscles and in bones, therefore it cannot be determined.

57. **(*a*)** Let x% of proteins of human body is equivalent to the weight of its skin x% of 24

$$= \frac{x}{100} \times 24 = 10$$

$$x = \frac{10 \times 100}{24}\% \; x = 41.66\%$$

58. **(*b*)**

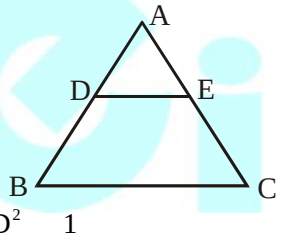


Δ ACB shaded area

= 2 × (Area of sector ADC – Area of ΔADC)

$$= 2 \times \left(\frac{\pi}{4} \times 1^2 - \frac{1}{2} \times 1 \times 1 \right) = \frac{\pi}{2} - 1 = \frac{\pi}{2} - 1$$

59. **(*b*)**



$$\frac{\text{Area of } \Delta ADE}{\text{Area of } \Delta ABC} = \frac{AD^2}{AB^2} = \frac{1}{16}$$

$$\Rightarrow \quad \frac{\text{Area WDBCE}}{\text{Area of } \Delta ABC} = \frac{15}{16} \quad \Rightarrow \quad \text{Area of } \Delta ABC = 45 \times \frac{16}{15} = 48$$

$$\Rightarrow \quad \text{Area of } \Delta ADE = \frac{48}{16} = 3$$

60. 43 min = 12 noon less 43 minutes
= 11.17.11.17 less 8 minutes
8 minutes = 11.09 .9 A.M + 129 minutes (43 × 3) = 11.09

UNIT-I

NUMBER & FRACTIONS

Numeral: In Hindu numeral Arabic system, we can use ten symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 called Digits to represent any number
A group of digits, denoting a number is called a numeral

Place Value

Place value of 2 is (2 × 1) = 2
Place value of 3 is (3 × 10) = 30
Place value of 1 is (1 × 100) = 100 and so on
Place value of 6 is $(6\times10^{8}) = 6000\,00000$

Face Value: The face value of a digit in a numeral is the value of the digit. Itself at whatever place. It may be in the above numeral the face value of 2 is 2. The face value of 3 is 3 and so on.

Types of Numbers

1. Natural Numbers
Counting numbers 1, 2, 3, 4, 5 ……. Are called natural number.

2. Whole Number
All counting number together with zero from the set of whole numbers. Thus
(*i*) 0 is the only whole number which is not a natural number
(*ii*) Every natural number is a whole number

3. Integers: All natural numbers, 0 and negatives of counting numbers (–3, –2, –1, 0, 1, 2, 3 ……..) together from the set of integers
1. Positive integers 2. Negative integers
3. Non positive and non positive integers

4. Even Numbers
A number divisible by 2 is called an even numbers

5. Odd Number
A number not divisible by 2 is called an odd number 1, 3, 5, 7, 9.

6. Prime Number
A number greater than 1 is called prime number if it is divisible by either 1 or it self.
Prime number up to 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
(*ii*) Prime numbers greater than : Let *p* be given number greater than 100. To find out whether it is prime or not we use the following method.
(*iii*) Find a whole number nearly greater than the square root of *p*.
(*iv*) Prime numbers less than 14 are 2, 3, 5, 7, 11, 13
(*v*) 191 is not divisible by any of them. So, 191 is a prime number.