IMPORTANT INSTRUCTIONS

- The maximum marks are 300. Time allotted is **90 MINUTES.**
- There are four sections in the question paper having total **75 questions:**
  - Section – A : Maths (20 Questions)
  - Section – B : Science (20 Questions)
  - Section – C : English (20 Questions)
  - Section – D : Aptitude (15 Questions)
- Each question carries **4 marks.**
- **Negative Marking : ¼ (One-fourth) mark** will be deducted for every incorrect answer.
- **Use only BLUE / BLACK pen to fill the circles in bubble sheet.**
- Use of PENCIL is strictly **not allowed.**
- **Do not use marker or white fluid** to hide the mark.

SECTION – A
MATHS

1) The value of x, if $5^{x-3}.3^{2x-8} = 225$ is _____.

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

2) If x = $2-\sqrt{3}$, then the value of $x^2 + \frac{1}{x^2}$ and $x^2 - \frac{1}{x^2}$ respectively, are _____.

   a) $14, 8\sqrt{3}$ b) $-14, -8\sqrt{3}$ c) $14, -8\sqrt{3}$ d) $-14, 8\sqrt{3}$

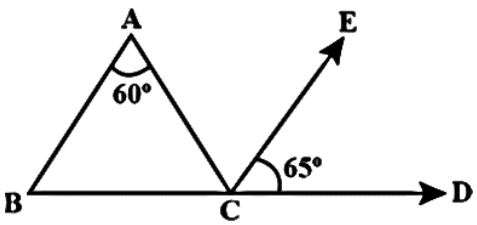
3) State 'T' for true and 'F' for false.

   (i) Origin is the only point which lies on both the axes.
   (ii) The point (2, -2) and point (-2, 2) lies in the same quadrant.
   (iii) A point lies on y – axis at a distance of 2 units from the x – axis, then it's coordinates are (2,0).
   (iv) Abscissa of a point is positive in I quadrant and also in II quadrant.

	(i)	(ii)	(iii)	(iv)		(i)	(ii)	(iii)	(iv)
a)	F	T	F	T	b)	T	F	F	F
c)	F	T	T	F	d)	T	F	T	F

4) In the given (fig. 1), if CE $\|\|BA$, then the value of ∠ACB is

   a) 60° b) 55°
   c) 70° d) 90°

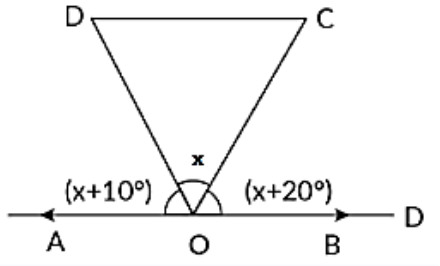


(fig. 1)

5) In the given (fig. 2), if OCD is an isosceles triangle in which OD and OC are equal, then what will be the value of ∠OCD?

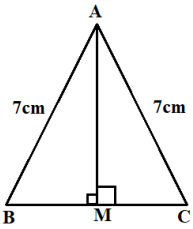
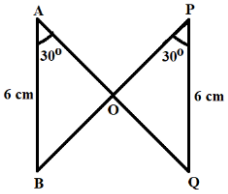
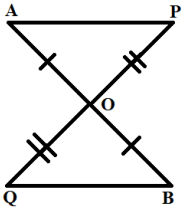
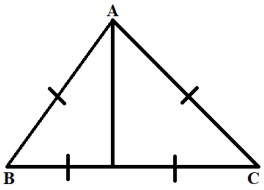
a) 70° b) 50°

c) 65° d) 45°



(fig. 2)

6) Match the following.

	Column – I	**Column – II**
P)	 Δ AMB $\cong$ Δ AMC by	1. SAS Rule
Q)	 $\Delta AOB \cong \Delta POQ$ by	2. RHS Rule
R)	 $\Delta AOP \cong \Delta BOQ$ by	3. SSS Rule
S)	 $\Delta AMB \cong \Delta AMC$ by	4. AAS Rule

	P	**Q**	**R**	**S**		**P**	**Q**	**R**	**S**
a)	2	4	1	3	b)	4	2	1	3
c)	1	2	4	3	d)	2	1	3	4

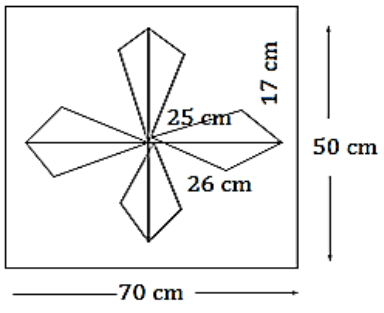
7) The area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm is $k\sqrt{30}cm^2$. Find the value of k.

a) 8 b) 6 c) 7 d) 9

8) A design is made on a rectangular tile of dimensions 50cm × 70cm as shown in (fig. 3). The design shows 8 triangles, each of sides 26 cm, 17 cm and 25 cm. Find the total area of the design and the remaining area of the tile respectively.

a) 1632 cm², 1886 cm² b) 1538 cm³, 1632 cm²

c) 1632 cm², 1868 cm² d) 1632 cm², 1538 cm²



(fig. 3)

9) A small village, having a population of 5000, requires 75 litres of water per head per day. The village has got an overhead tank of measurement 40 m x 25 m x 15 m. For how many days will the water of this tank last?

a) 30 days b) 40 days c) 32 days d) 45 days

10) The value of P, if $\frac{a^2-19a-25}{a-7} = a - 12 + \frac{P}{a-7}$, is _____.

a) –109 b) 110 c) 109 d) –110

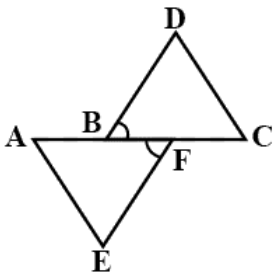
11) A copper wire is 4mm in diameter and is wound around a cylinder whose length is 1.2 m and diameter is 12 cm, so as to cover the curved surface of the cylinder. The length of the wire is

a) 11308 m b) 1256 m c) 11304 m d) 1.256 m

12) In the given (fig. 4), if AB = CF, EF = BD and ∠AFE = ∠DBC. Then, ΔAFE and ΔCBD are congruent by which of the following criterion?

a) SAS b) SSS

c) ASA d) None of these



(fig. 4)

13) Read the statements carefully.

Statement-1 : The product of a rational and an irrational number is irrational number.

Statement-2 : Reciprocal of every rational number is a rational number.

Which of the following option is correct?

(A) Both Statement-1 and Statement-2 are true.

(B) Statement-1 is true but Statement-2 is false.

(C) Statement-1 is false but Statement-2 is true.

(D) Both are false.

14) Match the following.

	Column I		**Column II**
(p)	If $\frac{3}{x+8} = \frac{4}{6-x}$, then x is _____.	(i)	3
(q)	If $\frac{2^{x-1} \cdot 4^{2x+1}}{8^{x-1}} = 64$, then x is _____.	(ii)	$5^{\frac{5}{2}}$
(r)	If $4^x - 4^{x-1} = 24$, then $(2x)^x$ is _____.	(iii)	-2
(s)	If $4^{x+1} = 256$, then x is _____.	(iv)	1

a) (p) → (i); (q) → (ii); (r) → (iii); (s) → (iv) b) (p) →(iii); (q) → (iv); (r) → (i); (s) → (ii)

c) (p) → (i); (q) → (iv); (r) → (ii); (s) →(iii) d) (p) →(iii); (q) → (iv); (r) → (ii); (s) → (i)

15) Match the following.

	Column I		**Column II**
(P)	$4x + 3y = 24$	(i)	(2, -3)
(Q)	$\frac{x}{2} - \frac{y}{3} = 2$	(ii)	(2, 3)
(R)	$3x + 5y = 15$	(iii)	(3, 4)
(S)	$\frac{x-2}{3} = y - 3$	(iv)	3, $\frac{6}{5}$

a) (P)→(ii); (Q)→(i); (R)→(iv); (S)→(iii) b) (P)→(iii); (Q)→(i); (R)→(iv); (S)→(ii)

c) (P)→(ii); (Q)→(iv); (R)→(i); (S)→(iii) d) (P)→(iii); (Q)→(iv); (R)→(i); (S)→(ii)

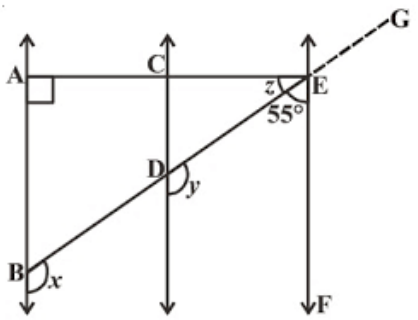
16) According to Euclid's axioms, the _____ is greater than the part.

a) half b) large c) whole d) none of these

17) In the given (fig. 5) (not drawn to scale), AB ∥ EF. If EA ⊥ BA and ∠BEF = 55°, then the values of x, y and z respectively are

a) $130°, 50°, 40°$ b) $125°, 125°, 35°$

c) $125°, 35°, 35°$ d) $35°, 150°, 35°$



(fig. 5)

18) Let ABC be a triangle in which BC=5 cm, ∠B = 60° and AC+AB= 7.5cm. Given below are the steps of constructing the triangle ABC. Which of the following steps is INCORRECT?

Step I : Draw a line segment BC of length 5cm.

Step II : Draw an ∠XBC = 60° at point B of line segment BC.

Step III : Cut off PB = 3.5cm on the ray BX .

Step IV : Join PC.

Step V : Draw ⊥ bisector of BC which intersect ray BX at A .Join AC.

Step VI : ABC is the required triangle.

a) Step II only b) Step III only c) Step II only d) Step III only

19) Read the following statements carefully and write 'T' for true and 'F' for false.

i) Volume of a cylinder is three times the volume of a cone with the same base and of same height.

ii) Volume of biggest sphere in cube of edge 6cm is 36π cm^3.

iii) Total surface area of a cone of radius (r)and slant height (l)is $\pi rl + \pi r^2$.

	(i)	(ii)	(iii)		(i)	(ii)	(iii)
a)	T	F	T	b)	T	T	T
c)	F	T	F	d)	F	T	T

20) A circus tent is cylindrical upto a height of 3 metres and conical above it. If its diameter is 105m and the slant height of the conical portion is 53m, calculate the length of the canvas 5m wide to make the required tent.

a) 1996m b) 2096m c) 1947m d) 1800m

SECTION – B
SCIENCE

21) Which of the following statement(s) is/are not true?

I. The pressure of a gas is due to collision of the gas molecules with the walls of the container.

II. The molecular velocity of any gas is directly proportional to the square root of the absolute temperature.

III. The rate of diffusion of a gas is directly proportional to the density of the gas at constant pressure.

IV. Kinetic energy of an ideal gas is directly proportional to the absolute temperature.

a) I and II b) II and III c) Only III d) Only IV

22) Which of the following statements is/are true.

I. Mixture may contain the components in any ratio and their composition is variable.

II. Pure substances have fixed composition.

III. The constituents of pure substances cannot be separated by simple physical methods.
IV. Copper, glucose, silver, gold, water are the examples of pure substances.
V. Glucose contains carbon, hydrogen and oxygen.

a) I, II and III b) III, IV and V c) II, IV and V d) all of these

23) Seema told Rohan that water is a compound, not an element and to justify it, she gave the following reasons:

I. Heat and light are given out during its formation from its constituent elements.
II. It contains hydrogen and oxygen in the ratio of 1: 8 by mass.
III. Its boiling point is 373 K under one atmospheric pressure.

The correct reasons are

a) I and II b) II and III c) I and III d) I, II and III

24) Which one of the given options is/are not true?

I. Mitochondria is involved with the formation of lysosomes.
II. Nucleus, mitochondria and plastid have DNA. Hence, they are able to make their own structural protein.
III. Mitochondria is said to be the powerhouse of the cell as ATP is generated in them.
IV. Cytoplasm is called as protoplast.

a) I and IV b) III and IV c) I and II d) II and IV

25) Match column I with column II and select the correct option given below:

	Column I		**Column II**
A	Cell membrane	1.	Head quarter of the cell
B	Nucleus	2.	Security guard of the cell
C	Endoplasmic reticulum	3.	Kitchen of the cell
D	Chloroplast	4.	Suicidal bag of the cell
E	Golgi body	5.	Channel for transportation and detoxification
F	Lysosome	6.	Packaging of product and formation of lysosome

Codes

	A	**B**	**C**	**D**	**E**	**F**
a)	2	1	6	5	4	3
b)	2	1	5	3	6	4
c)	6	5	4	3	1	2
d)	1	2	4	3	6	5

26) If the tip of sugarcane plant is removed from the field, even then it keeps on growing in length. Which part of the plant is responsible for this? Select the correct option.

a) Cambium b) Apical meristem c) Lateral meristem d) Intercalary meristem

27) Match the solutions given in Column A with their types given in Column B and choose the correct answer using the codes given below the columns.

	Column I		**Column II**
P.	Alcohol + water	I	Gas in liquid
Q.	Amalgamated zinc	II	Solid in liquid
R.	Aqueous solution of sodium chloride	III	Liquid in liquid
S.	Aerated water	IV	Liquid in solid
		V	Solid in solid

Codes

	P	**Q**	**R**	**S**
a)	III	IV	II	I
b)	III	V	II	I
c)	III	V	I	II
d)	III	II	IV	I

28) A drop of blood is put on three slides A, B and C which have Ringer's solution, water and concentrated salt solution. Which of the following observations is correct?
   a) RBCs appear circular and biconcave in A
   b) RBCs appear swollen and burst in B
   c) RBCs appear shrunken and crenated in C
   d) All of the above

29) Find out incorrect sentence:
   a) Parenchymatous tissues have intercellular spaces
   b) Collenchymatous tissues are irregularly thickened at corners
   c) Apical and intercalary meristems are permanent tissues
   d) Meristematic tissues, in their early stage lack vacuoles

30) Which of the following animals possess a vascular system?
   a) Starfish b) Hydra c) Jellyfish d) All of these

31) You are aware of Polio Eradication Programme in your city. Children are vaccinated because
   a) Vaccination kills the polio causing micro-organisms
   b) It prevents the entry of polio causing organism
   c) It creates immunity in the body
   d) All of the above

32) The isotope of cobalt used in the treatment of cancer and iodine used in the treatment of goiter respectively are:
   a) I – 132 and Co – 61 b) I – 132 and Co – 60
   c) Co – 60 and I - 131 d) I – 131 and Co – 61

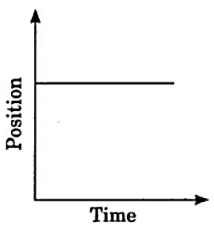
33) Which one of the following species of honeybee is an Italian?
   a) Apis dorsata b) Apis florae c) Apis cerana indica d) Apis mellifera

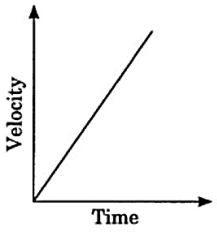
34) A body travels from station A to B at 40 ms^{-1} and from station B to A at 60 ms^{-1}. The average velocity of the body is
   a) 48 ms^{-1} b) 40 ms^{-1} c) 60 ms^{-1} d) Zero

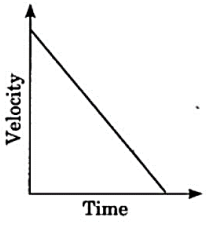
35) The number of joules contained in 1 kwh is
   a) 36×10^{5} J b) 3.6×10^{7} J c) 36×10^{8} J d) 3.7×10^{7} J

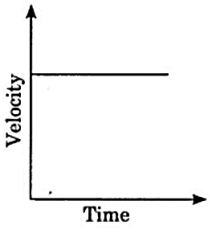
36) An athlete does not come to rest immediately after crossing the winning line due to the ____.
   a) Inertia of motion b) Inertia of rest
   c) Inertia of direction d) None of these

37) A motorcyclist drives from A to B with a uniform speed of 30 kmh^{-1} and returns back with a speed of 20 kmh^{-1}. Find its average speed.
   a) 20 kmh^{-1} b) 24 kmh^{-1} c) 15 kmh^{-1} d) 28 kmh^{-1}

38) A car is moving along a straight road with uniform velocity. Which of the following represents correct graph?
   a) 

   b) 

   c) 

   d) 

39) Identify the correct statements:
   I. Dalton's atomic theory proposed that the atoms of each element have their characteristic mass.
   II. The mass of an atom is expressed relative to the mass of a reference atom so that the atomic mass becomes a simple number.

III. At present, the standard for comparison of atomic masses is fixed as the mass of an atom of carbon is taken as 12 units.

IV. One twelfth $\left(\frac{1}{12}\right)$ of the mass of carbon atom (C- 12) is taken as one unit and is called as atomic mass unit (a.m.u) or simple 'u' (unified mass unit).

a) I and II b) III and IV c) II and III d) all of these

40) The number of protons , neutrons and electrons in four elements I, II, III, IV are as follows

I. $p = 6, n = 6, e = 6$ II. $p = 6, n = 7, e = 6$

III. $p = 18, n = 22, e = 18$ IV. $p = 19, n = 21, e = 19$

in these.

a) elements I and II are isotopes and elements III and IV are isobars
b) elements I and II are isotopes but elements III and IV are not isobars
c) elements I and II are isobars and element III and IV are isotopes
d) elements I and II are isobars but element III and IV are not isotopes

SECTION – C
ENGLISH

Read the given passage and answer the questions that follow by selecting the most appropriate option.

Athough Indians spend less money on allopathic medicines than people in most Asian countries. More than 40,000 drug formulations are available here. All manufactures are required by law to provide information about their product either on the packaging or in a pamphlet inside. But, in many cases, this information is very meagre and hard to understand. Many doctors, too, do not tell their patients anything about the drugs they prescribe.

What should we be concerned about when we take drugs? There are two areas: (1) Side effects; Many people taking a drug will notice an undesirable reaction, usually minor. But even the mildest drugs can harm if taken improperly, long enough or in excessive doses. Everyone responds to a drug differently. (2) Failure to follow directions; Many of us disobey prescription instructions on how much to take and when. It is easy to fall into thinking that more of the drug will speed up the healing. It is more common, however for people to stop taking a drug when they begin to feel better. This too can be dangerous.

What are the steps to be taken for safety ? (1) Take a drug only as recommended on the label or by the doctor. (2) If you feel ill after taking a drug, check it with doctor. (3) Do not mix drugs. (4) Check whether any food or activities are to be avoided.

41) Which one of the following statements is true?

a) Indians use more than 40,000 allopathic drugs
b) Indians hate allopathic medicines
c) Other Asian countries do not have allopathic medicines
d) Indians cannot afford allopathic drugs

42) How are drug users instructed by the manufactures?

a) Doctors should give a manual of instruction
b) The chemist should issue an instruction manual
c) Information should be printed on the carton or in a pamphlet kept inside it
d) Patients should keep in touch with drug manufacturer

43) Only one of the following sentences is right. Identify it.
   a) All medicines produce reactions of various degrees in their users
   b) Even mild drugs are not always safe
   c) Medicines should be discontinued as soon as we feel better
   d) More than the prescribed dose brings quicker recovery

44) Drug manufactures _____.
   a) do not give instructions. b) give very little and unintelligible information.
   c) give all instructions necessary. d) give information only when asked.

45) Which one of the following is true?
   a) Throw away the drug that produces side effects and try another
   b) Drugs may be taken with all kinds of foods
   c) Drugs do not inhibit our normal life style
   d) Drugs should be used only according to prescription

WORD AND STRUCTURE KNOWLEDGE

Read each sentence and find out whether there is any grammatical error in it. if it will be in any one part of the sentence, the number of that part is the answer. If there is no error, the answer is 'd', i.e., No error. (Ignore the errors of punctuation, if any.)

46) a) We admired the way b) he had completed all his work
   c) and appreciating the method d) no error

47) Four words are given in each question, out of which only one word is correctly spelt. Find the correctly spelt word and mark your answer in the Answer Sheet.
   a) juvinnile b) juvenile c) juvinile d) juvenille

48) Given below are four alternatives for the given idiom. Choose the most appropriate option.
   'To be between the devil and the deep sea'.
   a) to be in a dangerous spot b) to be faced with two dangerous alternatives
   c) to face devilish storm at sea d) to be most unlucky

49) In the following passage some of the words have been left out. First read the passage over and try to understand what it is about, then fill in the blank with the help of the alternatives given.
   There **(1)** _____ in the city of Ujjain a poor tailor **(2)** _____ Ramphal. As he was very poor, he **(3)** _____ to live and work in one little room with his wife and **(4)** _____ three small children. The children fought **(5)** _____ each other and made so much noise.

(1)	a)	inhabited	b)	stayed	c)	lived	d) existed
(2)	a)	famous	b)	known	c)	named	d) titled
(3)	a)	wished	b)	liked	c)	had	d) wanted
(4)	a)	few	b)	a few	c)	their	d) some
(5)	a)	to	b)	upon	c)	with	d) for

50) In the following question, the sentence has been given in Active voice. From the given alternatives, choose the one which best expresses the given sentence in Passive voice.
   Do you read detective novels these days?
   a) Have detective novels been read by you these days?
   b) Were detective novels read by you these days?
   c) Will detective novels be read by you these days?
   d) Are detective novels read by you these days?

51) Choose the most suitable option to transform the form of the given sentence keeping the meaning intact.
As soon as he got a placement abroad, he left the country.
a) No sooner did he get a placement abroad than he left the country.
b) He got a placement abroad than he left the country.
c) He waited for the placement to go to abroad.
d) He got the placement and he left the country.

52) Read the conversation given below and select the correct option to complete the narration.
Neel : Hi, Suresh, How are you?
Suresh : I am on the lookout of a job.
Neela : What kind of a job are you interested in?
Suresh : I am interested in administrative accounts.
Neela on meeting Suresh asked him how he was. Suresh replied that he was on the lookout for a job. Neela asked him_____. Suresh told her that he was interested in administrative accounts.
a) what kind of a job he was interested in.
b) what kind of a job he is interested in.
c) what kind of a job he interested in.
d) what kind of a job was he interested in.

53) Fill in the blanks by choosing the most appropriate words/phrases from the given options.
When the moon gets (a) _____ Earth and Sun, and (b) _____ the solar disc completely, a total solar eclipse occurs. A total solar eclipse is (c) _____ most spectacular celestial event (d) _____ can view from Earth. It is a great astronomical event.

a)	between	b)	on	c)	of	d)	in
a)	covers	b)	has been covered	c)	covered	d)	being covered
a)	the	b)	an	c)	very	d)	a
a)	one	b)	you	c)	a	d)	the

54) Read the passage given below and fill in the blanks by choosing the most appropriate words from the given options.
When India got Independence from the British, most things associated with (a) _____ British were done away with, but some of (b) _____ pretty letter-boxes managed to survive. These letter-boxes have (c) _____ nostalgic aura about them. Some are over 150 years old. Now they all bear the logo of (d) _____ Indian Postal Services.

	A	B	C	D		A	B	C	D
a)	and	an	a	the	b)	a	the	but	an
c)	a	an	the	nor	d)	the	the	a	the

55) Fill in the blanks by choosing the correct option.
The mud houses are not _____ the buildings in your city.
a) comparable to b) comparable of c) comparable as d) comparable for

56) Complete the given narrative, by filling in the blank with the correct option
As I was standing on the dock, looking out at the lake last time, a feeling of emptiness _____ over me like darkness.
a) will wash b) had washed c) will have washed d) washed

57) Select the option which best explains the meaning of the idiom marked in the braces(" "): He is a "queer fish". I have failed to understand him.
a) funny person b) sensitive person c) strange person d) quarrelsome person

58) Choose the word or phrase that can substitute the highlighted word: That student is discourageous; he **"grumbles"** no matter how one tries to please him.
a) iggles b) scolds c) complains d) sneers

59) In the given question, a part of the sentence is given in quotes. Choose the correct alternative from the options: 100 km "are not a great distance" in these days of fast-moving vehicles.
a) is not a great distance b) is no distance
c) aren't a great distance d) no changes required

60) Rearrange the given sentences into a meaningful sequence.
a) P : Or omit some of these elements creating a new variety
b) Q : Different styles or types of music may emphasise, de-emphasise
c) R : General definitions of music include common elements such as pitch
d) S : Rhythm, dynamics, and the sonic qualities of timbre and texture
a) SRQP b) RSPQ c) RSQP d) SRPQ

SECTION – D
APTITUDE

61) How many 8's are there in the following number series each of which is exactly divisible by its immediately preceding number and also divisible by its immediately succeeding number?
8, 2, 4, 5, 1, 7, 2, 8, 4, 8, 4, 2, 2, 8, 2, 6, 9, 8, 4, 5, 4, 8, 3, 2, 8, 4, 3, 1, 8, 3
a) 1 b) 4 c) 3 d) 2

62) Three positions of a dice are given in (fig. 6). Identify the number on the face opposite to 6.
a) 1 b) 4
c) 5 d) 7



(fig. 6)

63) Insert the missing number in the given series 0, 4, 18, 48, ?, 180
a) 58 b) 68 c) 84 d) 100

64) 'Pull' is related to 'Push' in the same way as 'Low' is related to
a) medium b) high c) more d) long

65) In a certain code MEAN is written as '8964' and NOBLE is written as '47529'. How is LOAM written in that code?
a) 2768 b) 2758 c) 2968 d) 2468

66) A boy goes to market and finds a man who is his relative. The man is the husband of the sister of his father.
How is man related to the boy?
a) Nephew b) Uncle c) Father d) Father-in-law

67) **Directions:** select the best alternative which fits in place of (?) mark.
Horse: Jockey: Car: ?
a) Mechanic b) Brake c) Chauffeur d) Wheels

68) In a certain code, 'BEAT' is coded as '+%@ #' and 'SWEET' is coded as '*© %%#, then how is 'TEASE' 'coded?
a) % # © + % b) % % # © @ c) # % @ * % d) # © % @ *

69) Arrange the given words in a meaningful sequence and then choose the most appropriate sequence from the alternatives provided below the question.

(i) Crime (ii) Judge (iii) Police (iv) Judgment

a) (i), (ii), (iii), (iv) b) (iii), (ii), ((i), (iv) c) (ii), (iii), (iv), (i) d) (i), (iii), (ii), (iv)

70) Pointing to the man in the photograph, Ravi said,' His mother has only one grandchild whose mother is my sister.' How is Ravi related to the man in photograph?

a) Father-in-law b) Brother-in-law c) Father d) Brother

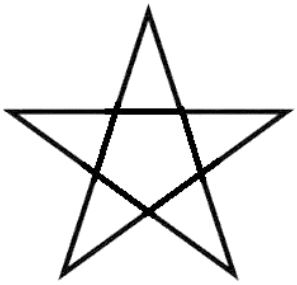
71) All the boys of a class are standing in a single row. One boy is 19^{th} in order from both the ends. How many boys are there in the class?

a) 39 b) 38 c) 37 d) 39

72) How many triangles are there in the (fig. 7)

a) 5 b) 6

c) 8 d) 10

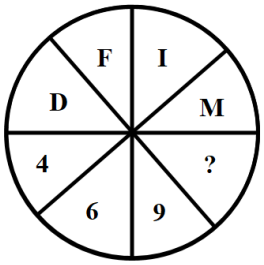


(fig. 7)

73) Find the missing term in (fig. 8)

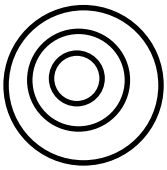
a) 10 b) 13

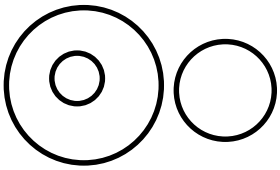
c) 12 d) 14

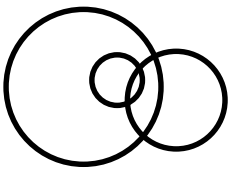


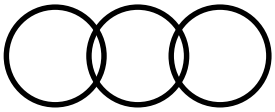
(fig. 8)

74) Which of the following Venn diagram best describes the relationship amongst, milk, apple and fruit?

a) 

b) 

c) 

d) 

75) If in a certain code language, MANGO is coded as 31-1-41-7-51, then how will LEAF be coded in that language?

a) 31-10-8-9 b) 21-10-9-8 c) 21-5-6-1 d) 21-5-1-6