Class – IX

School Integrated Program

ENTRANCE TEST CUM SCHOLARSHIP TEST

[Time: 2 Hours]   **[Max Marks: 400]**

A. *General:*

1. *This booklet is a Question Paper containing 100 questions.*

2. *Blank Papers, Clipboards, Log Tables, slide rules, calculators, cellular phones, pagers and electronicgadgets in any form are not allowed to be carried inside the examination hall.*

3. *The answer sheet, a machine-readable optical mark recognition sheet (OMR Sheet), is providedseparately.*

4. *DO NOT TAMPER WITH THE OMR OR THE BOOKLET.*

5. *Please fill your roll number correctly in the OMR sheet (answer sheet).*

6. *Both Question Paper and OMR Answer Sheet will be submitted after completion of this examination.*

B. *Question Paper Format and marking scheme:*

1. *The Question Paper consists of five parts (Part I: MAT, Part II: Physics, Part III: Chemistry, Part IV: Biology, Part V: Mathematics).*

2. *Each Question carries +4 marks for correct answer and -1 mark for incorrect answer.*

MAT

Directions (Q.1-3): what will come in place of question mark in the following series?

1. 63,58,51,40,27, ?

   (a) 8   (b) 12   (c) 10   (d) 14

2. 3,4,8,17,33,58, ?

   (a) 76   (b) 94   (c) 84   (d) 98

3. 8,48,16,96,32, ?

   (a) 192   (b) 150   (c) 58   (d) 288

Directions (Q.4-5): In each of the following questions, four terms/words have been given, out of which three are alike in some manner and one is different. Choose the odd one out.

4. (a) Broad: Wide   (b) Light: Heavy

   (c) Tiny : Small   (d) Big : Large

5. (a) BDYW   (b) CEXZ   (c) DFYW   (d) EGXV

6. If in a certain code, HAT is 782, RABBIT is 681192 . Then how will HABIT be coded as ?

   (a) 78139   (b) 78192   (c) 68192   (d) 78129

7. If REASON is coded as 5 , BELIEVED as 7 , what is the code number of GOVERNMENT?

   (a) 6   (b) 8   (c) 9   (d) 10

Directions (Q.8-9): Read the following information carefully to answer the questions.

(i) ' $A\$B$ ' means ' A ' is mother of ' B '

(ii) ' $A \# B$ ' means ' A ' is father of ' B '

(iii) ' $A @ B$ ' Means ' A ' is husband of ' B '

(iv) ' $A\%B$ ' means ' A ' is daughter of ' B '

8. P@Q$M# T indicates what relationship of P with T

   (a) Paternal grandmother   (b) Maternal grandmother

   (c) Paternal grandfather   (d) Maternal grandfather

9. Which of the following expressions indicates ' R is the sister of H '?

   (a) H $ D @ F # R   (b) R%D@ F$H

   (c) $R\$D@F\#H$ (d) $H\%D@F\$R$

10. Deepak said to Nitin, " That boy playing football is the younger of the two brothers of the daughter of my father's wife "How is the boy playing football related to Deepak ?

    (a) Son   (b) Brother   (c) Cousin   (d) Niece

11. If x means -,+ means ÷, − means × and ÷ means + then $15 - 2 \div 900 + 90 \times 100 = $?

    (a) 190   (b) 180   (c) 90   (d) -60

12. One morning after sunrise, Gopal was facing a pole. The shadow of the pole fell exactly to his right. Which direction was he facing?

    (a) South   (b) East

    (c) West   (d) Data inadequate

**Directions (Q.13-14):** Refer to the following Venn diagram
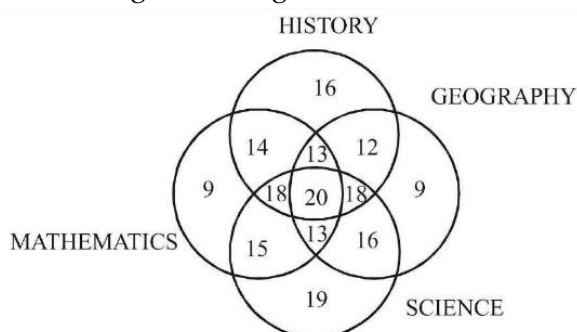
13. The number of students who took any three of the above subjects was

(a)   62   (b)   63   (c)   64   (d) 66

14. Which subject was taken by the largest number of students?

(a)   Mathematics   (b)   Science   (c)   Geography   (d) History

15. Choose the correct alternative that represents the relationship among illiterates, poor people and unemployed.

(a)   (b)

(c)   (d)
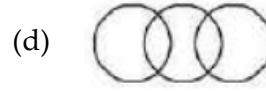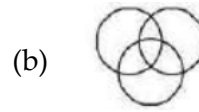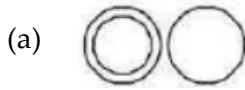
**16.** Monday falls on 4th April, 1998. What was the day on 3rd November, 1987 ?

(a)   Monday   (b)   Sunday

(c)   Tuesday   (d)   Wednesday

17. When the time is 4.20 , the angle between the hands of the clock is –

(a) $20°$ (b) $15°$ (c) $12\frac{1}{2}°$ (d) $10°$

Directions (Q.18-19): In each of the following questions, select a figure from the four alternatives, which when placed in the space where the question mark is shown in figure (X) would complete the figure.

18.

(a)   (b)   (c)   (d)

19.

(a)   (b)   (c)   (d)
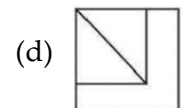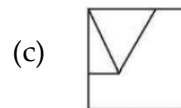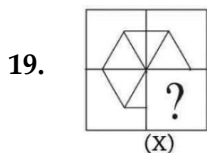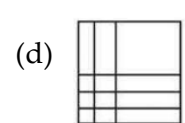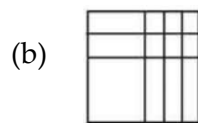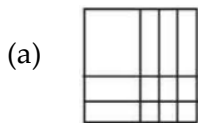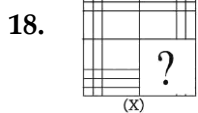
20. Find the correct option for the water image for the following question.

gLad

?

(a)   (b)

(c)   (d)
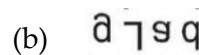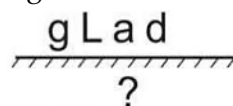
21. In the following question, choose the correct mirror-image of the Fig. (X) from amongst the four alternatives (a), (b), (c) and (d) given along with it.
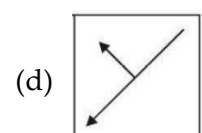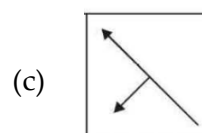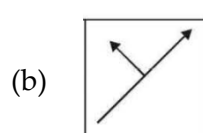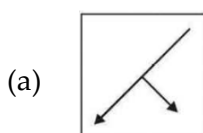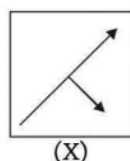
(a)   (b)   (c)   (d)

22. Consider the three figures, marked X, Y, and Z showing one fold in X , another in Y and the cut in Z. From amongst the four alternative figures (a), (b), (c) and (d) select the one showing the unfolded position of Z.

X   Y   Z
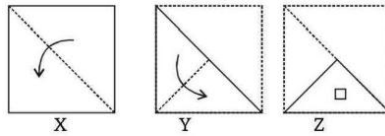
(a)   (b)   (c)   (d)

23. Consider the three figures, marked X, Y, and Z showing one fold in X , another in Y and the cut in Z. From amongst the four alternative figures (a), (b), (c) and (d), select the one showing the unfolded position of Z.

X   Y   Z
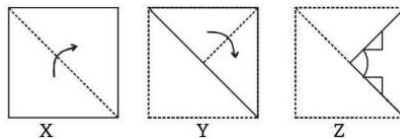
(a)   (b)   (c)   (d)

24. Find amongst the four alternatives (a), (b), (c) and (d), the figure which most nearly contains the figure (X).

(X)
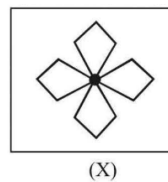
(a)   (b)   (c)   (d)

25. Find amongst the four alternatives (a), (b), (c) and (d), the figure which most nearly contains the figure (X).

(X)
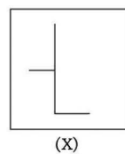
(a)   (b)   (c)   (d)

26. In the following question, there is a diagram marked (X), with one or more dots placed in it. The diagram is followed by four other figures, marked (a), (b), (c) and (d) only one of which is such as to make possible the placement of the alternative in each these.

(X)
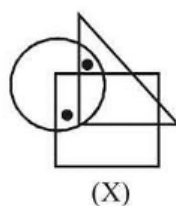
(a)   (b)   (c)   (d)

27. In the following question, two statements are given followed by four conclusions numbered I, II, III & IV. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts & then decide which of the following conclusions logically follows from the given statements disregarding commonly known facts.

Statements: Some bottles are drinks. All drinks are cups.

Conclusions:

I.   Some bottles are cups
II. Some cups are drinks
III. All drinks are bottles
IV. All cups are drinks.

(a)   Only I & II follow
(b)   Only II & III follow
(c)   Only II & IV follow
(d)   Only III & IV follow

Directions (Q.28 to 30): A number arrangement machine, when given a particular input, rearranges it following a particular rule. The following is the illustration of the input and the steps of arrangement:

Input, 27, 213, 309, 43, 89, 159, 275

Step I, 27, 213, 309, 159, 43, 89, 275   Step II, 27, 213, 89, 159, 309, 43, 275

Step III, 27, 309, 89, 159, 213, 43, 275

Step IV, 27, 43, 89, 159, 213, 309, 275

Step V, 27, 43, 89, 159, 213, 275, 309

This is the final arrangement and Step V is the last step for this input.

28. How many steps will be required to get the final output from the following input?
Input: 39, 149, 407, 79, 315, 217, 195

(a)   5   (b)   6   (c)   7   (d) 8

29. What will be the fourth step for the following input?

Input: 312, 49, 215, 413, 187, 297, 132

(a)   312,49,187,215,297,413,132
(b)   312,132,187,215,297,49,413
(c)   312,49,187,215,413,297,132
(d)   49,132,187,215,297,312,413

30. If following is the second step for an input, what will be the fifth step?
Step II: 439, 167, 297, 317, 517, 487, 132

(a)   167,517,297,317,439,487,132   (b)   517,167,297,317,439,487,132
(c)   132,167,297,317,439,487,517   (d)   Can't be determined

PHYSICS

31. Which of the following force depends on the speed of the particle.

(a)   Gravitational force   (b)   Fluid drag
(c)   electrostatic force   (d)   None of these

32. Three forces which are generally acting on an inflated balloon moving in upward direction in earth atmosphere.

(a)   Gravity, Electrostatic force, Magnetic force   (b)   Gravity, Air friction, Buoyancy
(c)   Gravity, Buoyancy, Magnetic force   (d)   None of these

33. Find out the number of images formed in the following case
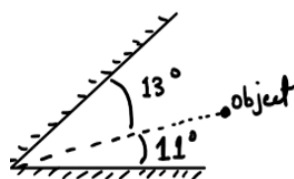
(a)   14   (b)   11   (c)   15   (d) None of these

34. A man standing at a position X in front of a plane mirror, a distance of y metre from the mirror as shown in figure. When the man moves 5 m away from the mirror, the new distance between the man and his image becomes 20 metres. What is the value of "Y"?
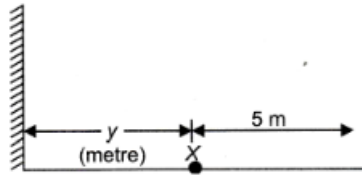
(a)   5m   (b)   10m   (c)   20m   (d) 40m

35. Two objects of weight 'W' is placed on the flat surface and a force of 'F' is applied on the objects as shown in figure. if the force of friction between ground and the object is shown in figure. then which of the statement is correct

(i)   (ii)

(a)   force of friction in case (i) is greater than case (ii)

(b)   force of friction in case (i) is lesser than case (ii)

(c)   force of friction in case (i) is equal to case (ii)

(d)   None of these

36. If a car is moving with the speed of 10m/s covered 72km and then with 20m/s covered 72km. find out the average speed of the car.
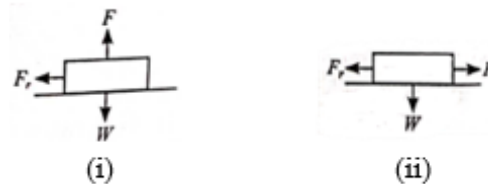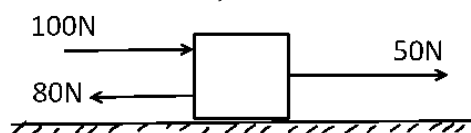
(a)   48km/hr   (b)   36km/hr

(c)   54km/hr   (d)   none of these

37. The maximum value of force required to make the body just to slide is known as ………

(a)   dynamic friction   (b)   static friction

(c)   limiting friction   (d)   rolling friction

38. If the following diagram forces are acting on the particle in a same plane as shown in figure. find out the force which must be applied so that the object will not move.

(a)   70N towards right   (b)   70N towards left

(c)   50N towards right   (d)   50N towards left

39. When two forces of same magnitude act in opposite directions, then is called _____. The net force acting is the_____. Due to which _____.

(a)   unbalanced forces, difference between two forces, the speed of the particle does not change

(b)   balanced forces, difference between two forces, the speed of particle does change

(c)   balanced forces, difference between two forces, the speed of particle does not change

(d)   none of these

40. A force of 320N is distributed uniformly on one surface of a cube of edge 4cm. The pressure on this surface is:

(a) 2×10^5 Pascal   (b) 2×10^4 Pascal

(c) 2×10^3 Pascal   (d)   None of these

41. Fig shows two plane mirrors, and an object O placed between them. What will be distance between the second image formed by each mirror.
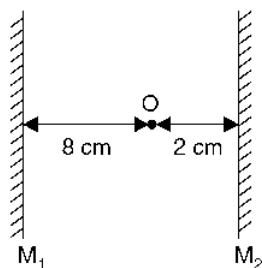
(a) 30cm   (b) 38cm   (c) 32cm   (d) 40cm

42. A and B are two objects with mass 90kg and 90kg respectively. Then
   (a) A has more inertia than B   (b) B has more inertia than A
   (c) A and B both have same inertia   (d) None of these

43. A Physical quantity 'Q' is derived by dividing force with the mass (Q = force/mass). What is the unit of Q.
   (a) m/s (b) m/s^2 (c) m^2/s^2 (d) m^3/s^2

44. Which of the following is responsible for wearing out of bicycle tyres.
   (a) Muscular force   (b) Magnetic force
   (c) Frictional force   (d) Electrostatic force

45. The ray is incident of first mirror at an angle of 20^0. Find out the angle of reflection of ray on second mirror.
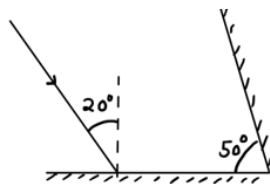
(a) 20°   (b) 35°
(c) 30°   (d) None of these

CHEMISTRY

46. Read the following statements and mark the correct ones from the given options.
   (i) Coal, petroleum and natural gas are called fossil fuels.
   (ii) Coal and natural gas are two exhaustible substances.
   (iii) Coke is used in manufacture of steel.
   (iv) Fossil fuels are present in limited quantities.
   (a) (i) and (ii)   (b) (i) and (iv)
   (c) (i), (ii) and (iii)   (d) (i), (ii), (iii) and (iv)

47. Which of the following is obtained from coal tar?
   (a) Petrol   (b) Coke
   (c) Air   (d) Naphthalene balls

48. Mark the incorrect statement.
   (a) CNG and LPG are clean fuels.
   (b) Petroleum is refined in a petroleum refinery.
   (c) Petroleum products are called petrochemicals.
   (d) Coal does not cause any pollution when burnt.

49. Which of the following will be obtained first from the fractional distillation of crude oil?
   (a) Bitumen   (b) Petrol
   (c) Kerosene   (d) Petroleum gas

50. Distilled water is
    (a) Poor conductor   (b) Good conductor   (c) Both (a) and (b)   (d) None

51. Flow of electrons is called
    (a) Electroplating   (b) Electric current   (c) Electrodes   (d) Electrolyte

52. Electroplating prevents
    (a) Current   (b) Chemical effect   (c) Rusting   (d) All

53. An electric lamp glows due to
    (a) Chemical effect   (b) Magnetic effect   (c) Heating effect   (d) None

54. One of the following is not used for electroplating metal articles. This one is :
    (a) nickel   (b) chromium   (c) sodium   (d) silver

55. An arrangement having two carbon rods kept in a conducting liquid in a vessel is known as :
    (a) rechargeable cell   (b) storage cell
    (c) biological cell   (d) electrolytic cell

56. What is deposited on the cathode during the electrolysis of copper sulphate using copper electrodes?
    (a) Oxygen   (b) Hydrogen   (c) Copper   (d) Sulphur

57. Which electrode is connected to the positive terminal of the battery in electrolysis?
    (a) Cathode   (b) Diode   (c) Anode   (d) Neutral

58. The product obtained from coal is/are
    (a) Coke   (b) Coal tar   (c) Coal gas   (d) All of these

59. Choose the correct statement from the following:
    (a) It is difficult to transport natural gas through pipes.
    (b) The disadvantage of natural gas is that it cannot be used directly for burning in homes.
    (c) Natural gas is stored under high pressure as compressed natural gas (CNG).
    (d) Natural gas cannot be used for power generation.

60. Natural gas mainly consists of
    (a) C_2H_6 (b) CH_4 (c) C_3H_8 (d) C_4H_{10}

BIOLOGY

61. The ideal months for harvesting kharif crop are
    (a) June/July   (b) August/September
    (c) September/October   (d) November/December

62. Which one of the following insects produce honey:
    (a) Antherae paphia   (b) Apis indica
    (c) Kerria lacca   (d) Bombyx mori

63. Why are earthworms good friends of farmers?
    (i) Their castings make the soil fertile.
    (ii) They help to drain and aerate the soil when they make tunnels in the soil.
    (iii) They loosen and mix the soil evenly when they burrow through the soil.
    (iv) They do not destroy the crops.
    (a) i and iii only   (b) i and iii only
    (b) ii and iii only   (d) i, ii iii and iv

64. Sandy soil is not good for plants because it
    (a) Cannot hold water.   (b) Has poor aeration.
    (c) Contain more minerals.   (d) Has poor drainage

65. Which of the following sets contains only herbicides?
    (a) Disyston, Malathion, Gammexane   (b) Butachlor, Dalapon, Disyston
    (c) Simazine, Dalapon, Butachlor   (d) Gammexane, Malathion, Simazine

66. Refer to the given flow chart and select the correct statement regarding P to S.
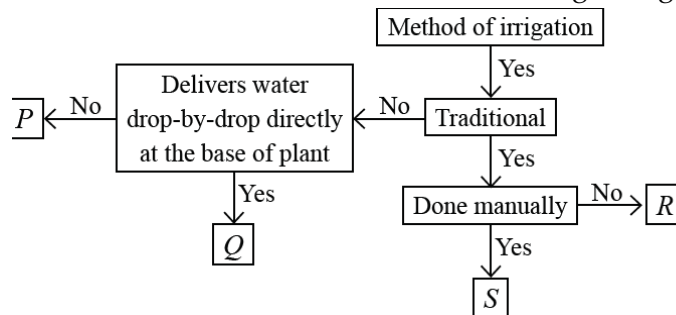
(a) P is done by spraying water over soil like artificial rain and it is most effective in clayey soil.
(b) Q is a method of micro irrigation that involves use of pipes and tubes with very small holes.
(c) R can be moat that causes a lot of water wastage.
(d) S can be rahat that involves use of oxen, buffaloes or cows.

67. Match items in column- A with those in column B.

	A		B
(i)	Kharif crops	(a)	Food for cattle
(ii)	Rabi crops	(b)	Urea and super phosphate
(iii)	Chemical fertilizers	(c)	Animal excreta, cow dung, urine and plant waste
(iv)	Organic manure	(d)	Wheat, gram, pea
		(e)	Paddy and maize

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

68. Which of the following is not correctly matched?
(a) Dengue fever – Dengue virus
(b) Plague – Yersinia pestis
(c) Syphilis – Protozoa
(d) Sleeping sickness – Trypanosoma

69. The microorganisms which cause diseases are called:
(a) Pathogens
(b) Microbes
(c) Vectors
(d) None of these

70. The proteins produced by our immune system to destroy the antigens are called :
(a) Antigens
(b) Vaccines
(c) Antibodies
(d) Agglutinin

71. Plasmodium is an example of :
(a) Bacteria
(b) Virus
(c) Protozoa
(d) Fungus

72. Penicillin is an antibiotic which is an extract from
(a) Rhizobium.
(b) Penicillium.
(c) Aspergillus.
(d) None of the above.

73. Process by which Yeast produces CO_2 during baking is :
(a) Fermentation
(b) Oxidation
(c) Preservation
(d) Vaccination

74. Select the incorrect statement.
(a) Anthrax is a bacterial disease that affects both humans and cattle
(b) Rust of wheat is a fungal disease that spreads by air
(c) Citrus canker is a viral disease that affects citrus fruits
(d) Yellow vein mosaic is a viral disease that affects ladyfinger

75. Refer to the given table showing some common human and plant diseases, their causative microorganisms and mode of transmission. Which among the following are incorrectly matched?

S.no.	Human/Plant disease	Causative microorganism	Mode of transmission
(i)	Measles	Bacteria	Air
(ii)	Typhoid	Virus	Water
(iii)	Hepatitis B	Bacteria	Air
(iv)	Citrus canker	Fungi	Air
(v)	Rust of wheat	Bacteria	Insect

(a) (i) and (ii) only
(b) (i), (iii) and (v) only
(c) (iv) and (v) only
(d) (i), (ii), (iii), (iv) and (v)

MATHEMATICS

76. Two taps A and B can fill a tank in 15 min and 20 min, respectively. If both the taps are opened simultaneously, then in how much time can the empty tank be filled?

(a) $8\frac{4}{7}$ h   (b) 8 min   (c) $8\frac{4}{7}$ min   (d) 16 min

77. A contractor can complete a certain piece of work in 9 days. He employed certain number of men, but 6 of them being absent from the very first day, the rest could finish the work in 15 days. How many men were originally employed?

(a) 12   (b) 15   (c) 18   (d) 24

78. If x varies inversely as y^3 and x is 16 when y is 5, then find x when y is 2.

(a) 250   (b) 225   (c) 450   (d) 550

79. Simplify : $\left(\frac{x^a}{x^b}\right)^{(a^2+b^2+ab)} \times \left(\frac{x^b}{x^c}\right)^{(b^2+c^2+cb)} \times \left(\frac{x^c}{x^a}\right)^{(c^2+a^2+ca)}$

(a) 1   (b) $(a+b+c)^3$

(c) $a^2+b^2+c^2$ (d) 0

80. Find the value of $\sqrt{\sqrt{3}+\sqrt{3+8\sqrt{7-4\sqrt{3}}}}$.

(a) 0   (b) 2   (c) 1   (d) 4

81. If $x=\frac{4\sqrt{2}}{\sqrt{2}+1}$, then find the value of $\frac{1}{\sqrt{2}}\left(\frac{x+2}{x-2}+\frac{x+2\sqrt{2}}{x-2\sqrt{2}}\right)$

(a) $\sqrt{2}$ (b) $12+\frac{8\sqrt{2}}{5}$ (c) $12-8\sqrt{2}$.   (d) $\frac{16\sqrt{2}+24}{5}$

82. The greatest 6-digit number, which is a perfect square is_____.

(a) 998001   (b) 995001

(c) 997001   (d) 996001

83. Square root of $\frac{0.081}{0.0064} \times \frac{0.484}{6.25} \times \frac{2.5}{12.1}$ is_____.

(a) 0.45   (b) 0.75   (c) 0.95   (d) 0.99

84. The value of $\sqrt[3]{\frac{-a^6\times b^3\times c^{21}}{c^9\times a^{12}}}$ is_____.

(a) $\frac{-bc^3}{a^2}$ (b) $\frac{bc^4}{a^2}$ (c) $\frac{-ab^4}{c^2}$ (d) $\frac{-bc^4}{a^2}$

85. Ananya took part in a race. She ran 1.7 km, jogged for $1\frac{2}{3}$ hours and walked the remaining 300 m of the race. If the total distance of the race was 17 km, find her jogging speed.

(a) $\frac{8\text{ km}}{\text{hr}}$ (b) $\frac{12\text{ km}}{\text{hr}}$

(c) $\frac{7\text{ km}}{\text{hr}}$ (d) $\frac{9\text{ km}}{\text{hr}}$

86. Find the value of

$$\frac{2}{1+\frac{1}{1-\frac{1}{2}}} \times \frac{3}{\frac{5}{6}\text{ of }\frac{3}{2}\div\frac{1}{4}}$$

(a) 0   (b) $\frac{1}{5}$ (c) $\frac{2}{5}$ (d) $\frac{3}{5}$

87. A steamer goes downstream and covers the distance between two ports in 5 hours while it covers the same distance upstream in 6 hours. If the speed of the stream is $\frac{1\text{ km}}{\text{hr}}$, find the speed of the steamer in still water.

(a) $\frac{12\text{ km}}{\text{hr}}$ (b) $\frac{11\text{ km}}{\text{hr}}$ (c) $\frac{13\text{ km}}{\text{hr}}$ (d) $\frac{14\text{ km}}{\text{hr}}$

88. Find the value of p from $\frac{2}{x}+p=3$, when

$$\frac{5(7x+5)}{3}-\frac{23}{3}=13-\left(\frac{4x-2}{3}\right)$$

(a) $0\frac{}{}$ (b) 1   (c) $2\frac{}{}$ (d) 3

89. X has twice as much money as that of Y and Y has 50% more money than that of Z. If the average money of all of them is ₹110, then the money which X has

(a) ₹ 55   (b) ₹ 60   (c) ₹ 90   (d) ₹ 180

90. Present ages of Sunita and Anand are in the ratio of $5:4$ respectively. Three years hence, the ratio of their ages will become $11:9$ respectively. What is Anand's present age in years?

(a) 24   (b) 27   (c) 40   (d) 30

91. The given pie chart shows the spendings of a family on various heads during a month. Study the graph and answer the questions. If the total income of the family is ₹25000, then the amount spent on rent and food together is_____.
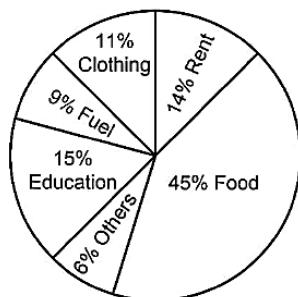
(a) ₹17250   (b) ₹14750   (c) ₹11250   (d) ₹8500

92. One card is drawn from a well-shuffled deck of 52 cards. Find the probability that the number on the card drawn is a multiple of 5.

(a) $\frac{4}{52}$ (b) $\frac{4}{13}$ (c) $\frac{7}{52}$ (d) $\frac{2}{13}$

93. Three unbiased coins are tossed. What is the probability of getting at most two heads?

(a) $\frac{3}{4}$ (b) $\frac{1}{4}$ (c) $\frac{3}{8}$ (d) $\frac{7}{8}$

**94.** $ABCD$ is a parallelogram. Find the angles x, y and z in the given figure.
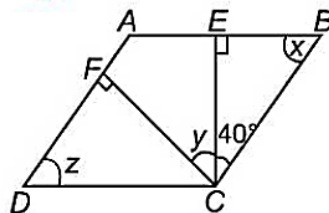
(a) $40°, 50°, 60°$ (b) $60°, 60°, 60°$

(c) $50°, 50°, 50°$ (d) $60°, 70°, 70°$

95. In the figure below, $PQRS$ is a square, LSR is an equilateral triangle. Find the value of $x + y + z$.
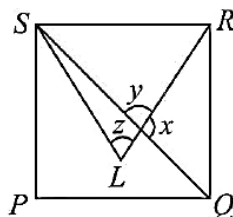
(a) 240°   (b) 90°   (c) 105°   (d) 60°

96. Select the INCORRECT statement.

(a) Every rectangle is a trapezium.

(b) A quadrilateral can be drawn if all four sides and one angle is known.

(c) Triangle is a polygon whose sum of exterior angles is double the sum of interior angles.

(d) If diagonals of a quadrilateral are equal, it must be a rectangle.

97. The exterior angle of a regular polygon is one-third of its interior angle. How many sides does the polygon has?

(a) 10   (b) 8   (c) 9   (d) 13

98. In the given figure (not drawn to scale), $ABCD$ is a trapezium with AB parallel to DC, ADE is an isosceles triangle with $AD = AE$. Find $\angle AEB$ and $\angle EAB$ respectively.
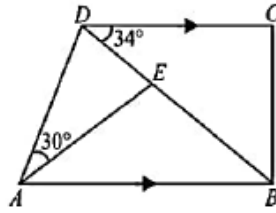
(a) $105°; 34°$ (b) $105°; 41°$ (c) $41°; 105°$ (d) $105°; 54°$

99. If $n = 1 + x$ and x is the product of four consecutive integers, then which of the following is true?

I. is an odd integer.

II. n is prime.

III. n is a perfect square.

(a) Only I is correct.   (b) Only III is correct.

(c) Both I and II are correct.   (d) Both I and III are correct.

100. If $x^2 + \dfrac{1}{x^2} = \dfrac{17}{4}$, then find the value of $\dfrac{2}{5}\left(x + \dfrac{1}{x}\right) + \left(x - \dfrac{1}{x}\right)$.

(a) $\dfrac{3}{2}$ (b) $\dfrac{25}{4}$ (c) $\dfrac{5}{2}$ (d) $\dfrac{9}{4}$