STUDY VAULT

committed to excellence

Class – VIII

ENTRANCE TEST CUM SCHOLARSHIP (SAMPLE PAPER-1)

[Time: 3 Hours]

[Max Marks: 450]

A. General:

1. This booklet is a Question Paper containing 150 questions.
2. Blank Papers, Clipboards, Log Tables, slide rules, calculators, cellular phones, pagers and electronic gadgets 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 provided separately.
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 +3 marks for correct answer and -1 mark for incorrect answer.

Directions (1 to 4) : *In the following question, there is a relationship between the number/letter/ figures on the left of the sign (: :). The same relationship exists to the right of the sign (: :) of which one is missing. Find the missing term from the alternatives.*

1. MAD : JXA : : RUN : ?
    (a) OSQ   (b) PRJ   (c) UXQ   (d) ORK

2. NOTE : RSXI : : RISK : ?
    (a) VMXP   (b) VMWO   (c) VJMP   (d) VMWP

3. TAME : OVHZ : : LUDO :
    (a) QZIT   (b) GQAM   (c) GPYJ   (d) GOYJ

4. LOVE : KMSA : : HATE : ?
    (a) GXQA   (b) DRXD   (c) ICWI   (d) GYQA

5. Look at the following figure. Find the pattern for writing a number in the small triangles and find the missing number?
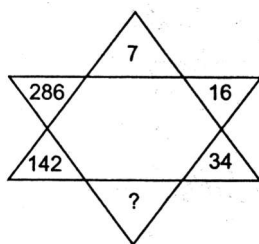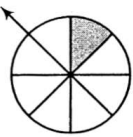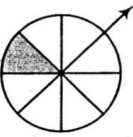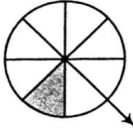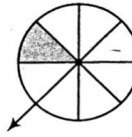

    (a) 38   (b) 66   (c) 68   (d) 70

6. Find from the alternatives, the number which will replace the question mark?

1	2	3
11	7	5
120	45	?

    (a) 15   (b) 16   (c) 17   (d) 18
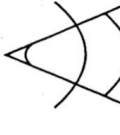
Directions (7 to 8) : *In the following questions, find the correct alternative which bears the same relationship given along with it.*

7. SANJU : SNU : NIVEDITA : NVDT : SNEHAL : ?.
    (a) SNH   (b) SEA   (c) SHA   (d) SEH

8. 42 : 56 : : 110 : ?
    (a) 132   (b) 136   (c) 140   (d) 18

9. A postman was returning to the post-office which was in front of him to the North. When the post-office was 100 m away from him, he turned to the left and moved 50 m to deliver the last letter at the Shanti Villa. He then moved in the same direction for 40 m, turned to his right and moved 100 m. How many metres was he away from the post-office?
    (a) 40 m   (b) 150 m   (c) 90 m   (d) 100 m

Directions (10 to 12) : *In the following questions, find the odd one out from the given alternatives.*

10. (a) 3 : 8   (b) 6 : 35   (c) 7 : 50   (d) 9 : 80

11. (a)   (b)   (c)   (d)

12. (a)   (b)   (c)   (d)

13. In the following number series, how many times an odd number is followed by two consecutive even numbers?

4 2 3 2 5 4 2 5 3 2 6 4 3 5 7 2 8 6 7 9 4 5 4 2 9 6 1 3 2

(a) 4   (b) More than 4   (c) 2   (d) 3

14. If following alphabets are arranged in the reverse order, which letter will be the 8th letter to the left of the 7th letter counting from the right end?
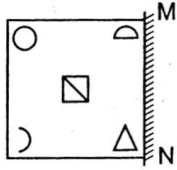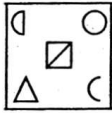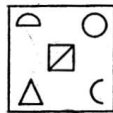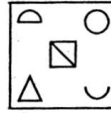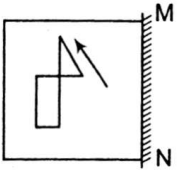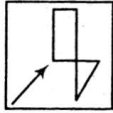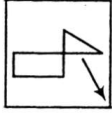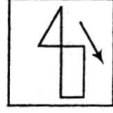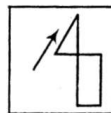
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

(a) P   (b) O   (c) Q   (d) N

15. How many 6's in the series are preceded by 5 but not followed by 9?

5 6 8 6 7 6 5 6 5 6 8 5 9 6 5 6 9 6 8 6 5 5 6 8 6 5 9 5 6 9 5 6 8

(a) 4   (b) 6   (c) 3   (d) 5

Directions (16 to 17) : *In the following questions, choose the correct mirror image from amongst the four alternatives a, b, c and given along with it.*

16.

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

17.

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

18.
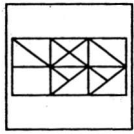
(a)   (b)   (c)   (d)

19.
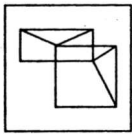
(a)   (b)   (c)   (d)

20. A person walks 10 m towards East and then 10 m to his right. Then, every time turning to his left, he walks 5, 15 and 15 m, respectively. How far is he now from his starting point?

(a) 5 m   (b) 10 m   (c) 15 m   (d) 20 m

21.

X

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

22. Poonam said to her friend, 'Yesterday I attended the birthday party of the son of the only son-in-law of my mother's mother.' How is Poonam related to the man, whose birthday party she attended?

(a) Niece   (b) Daughter   (c) Sister   (d) Mother

23. The son of M is father of N and grandfather (mother's father) of R. S is the daughter of N and sister of B. On the basis of this information, how is M related to B?

(a) Grandfather   (b) Grandmother

(c) Grandmother's mother   (d) None of these

24. Shehnaz wants to go the market. She starts from her home which is in North and comes to the crossing. The road to her left ends in a park and straight ahead is the office complex. In which direction is the market to the crossing?

(a) East   (b) West   (c) North   (d) South

25. Miss Anushka goes for her morning walk at 6 O'clock towards sun for 2 km, then she turns to her right and walks 3 km. From here, she turns to her left and walks 2 km, finally she turns to her left to walk another 6 km. In which direction is she facing and at what distance from the last turn, she is standing?

(a) East, 6 km   (b) East, 9 km   (c) North, 6 km   (d) North, 9 km

Directions (26 to 29) : Study the following information carefully and answer the questions given below it.

Shalu, Charu, Lata, Tom and Sandy help themselves to take some from bowl. Four of the each take a gulab jamun. Charu and Tom do not take a burfi as all the other do. Infact Charu takes only one sweet, which is a laddu. Apart from Charu, only Shalu and Sandy do not take peda.

26. Who only had peda and gulab Jamun?

(a) Charu   (b) Sandy   (c) Shalu   (d) Tom

27. Who takes three sweets?

(a) Charu   (b) Sandy   (c) Shalu   (d) Lata

28. Who are the two people taking the same number and same type of sweets?

(a) Shalu and Lata   (b) Sandy and Lata   (c) Shalu and Sandy   (d) Tom and Sandy

29. In total how many pieces sweets were taken by the group?

(a) 11   (b) 12   (c) 9   (d) 10

Directions (30 to 33) : Study the following information carefully and answer the questions given below it. In the following questions answers are based on the diagram given below, where the triangle represents doctors, the circle represents players and rectangle represents the artists.
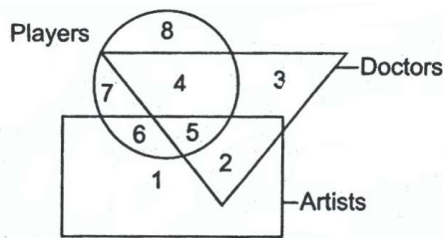
30. Which numbered space in the diagram represents doctors, who are also players and artists?

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

31. Which numbered space in the diagram represents artists, who are players?

(a) 6   (b) 7   (c) 8   (d) 4

32. Which numbered space in the diagram represents artists, who are neither players nor doctors?

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

33. Which numbered space represents players, who are neither artists nor doctors?

(a) 1, 2   (b) 3, 4   (c) 6, 7   (d) 7, 8

Directions (34 to 40) : *A table of words and their codes is given below. Analyse the pattern of transformation of code into words and answer questions based on them.*

	Column-I		Column-II
1.	DESIGN	A.	uklbjz
2.	INFORM	B.	cbxkfy
3.	MOTHER	C.	ygzwxc
4.	RIGHTS	D.	bjucgw
5.	TAILOR	E.	wcpybv
6.	GARDEN	F.	vzcjlk

34. What is the code for the letter N?

(a) u   (b) k   (c) c   (d) g

35. What is the code for the letter F?

(a) l   (b) b   (c) f   (d) g

36. What is the code for the letter O?

(a) y   (b) k   (c) v   (d) c

37. What is the code for the letter S?

(a) z   (b) w   (c) u   (d) x

38. What is the code for the letter G?

(a) l   (b) p   (c) b   (d) j

39. If FRIEND is coded as HUMJTK, how is CANDLE written in that code?

(a) EDRIRL   (b) DCQHQV   (c) ESJFME   (d) FYOBOC

40. If ROSE is coded as 6821, CHAIR is coded as 73456 and PREACN is coded as 961473, what will be the code for SEARCH?

(a) 246173   (b) 214673   (c) 214763   (d) 216473

Directions (41 to 48) : *Study the following information carefully and answer the questions given below it. In a certain code 'il be pee' means 'roses are blue', sik hee' means 'red flowers' and 'pee nut hee' means flowers are vegetables'.*

41. How is 'red' written in that code?

(a) hee

(b) sik

(c) be

(d) Cannot be determined

42. How is 'rose' written in that code?

(a) il

(b) pee

(c) be

(d) Cannot be determined

43. How is 'vegetables are red flowers' written in that code?

(a) sik pee hee be

(b) il sik nut hee

(c) pee sik nut hee

(d) Cannot be determined

44. In a certain code 'TREAD' is written as '7%#94' and 'PREY' is wirtten as $%#8'. How is 'ARTERY' written in that code?

(a) 9#7%#8   (b) 9#%7#8   (c) 9%7#%8   (d) 9%#7%8

45. If O = 16 and FOR = 42, then what is FRONT equal to ?

(a) 61   (b) 65   (c) 73   (d) 78

46. If B is coded as 8. F is coded as 6. Q is coded as 4, D is coded as 7, T is coded as 2, M is coded as 3 and K is coded as 5, then what is the coded form of QKTBFM?

(a) 425783   (b) 452683   (c) 452783   (d) 452863

47. If POND is coded as RSTL, how is HEAR written in that code?

(a) GHIJ   (b) GHIZ   (c) JIGZ   (d) JCLZ

48. In a certain code language, 24685 is written as 33776, how is 35791 written in that code?

(a) 44826   (b) 44882   (c) 46682   (d) 44682

Directions (49 to 50) : Read the statement given below. Find out the diagram(s) from the given alternatives representing the statement correctly.

49. **Statements** No magazine is cap. All caps are cameras.
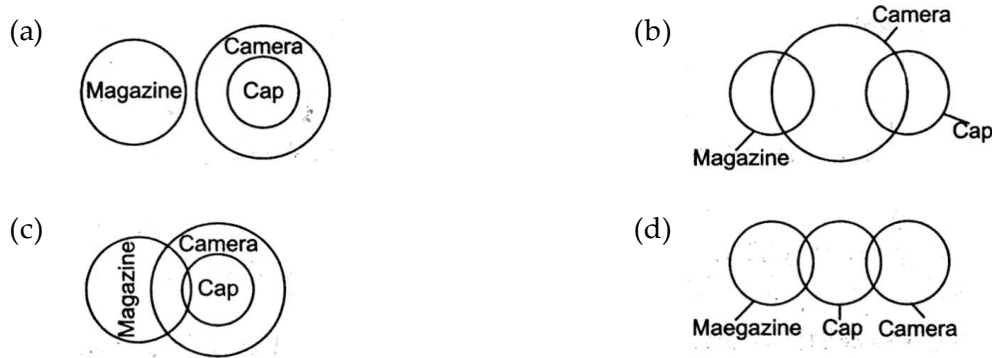
50. **Statements** All trains are buses. No room is bus. All boats are rooms.
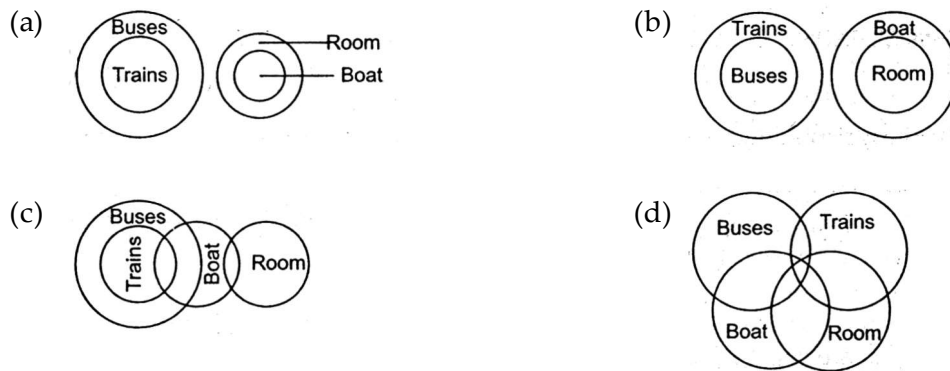
51. Ravi travelled 4 km straight towards South. He turned left and travelled 6 km straight, then turned right and travelled 4 km straight. How far is he from the starting point?

(a) 8 km   (b) 10 km   (c) 12 km   (d) 18 km

52. Jaya's position from the left in a row of students is 12th and Rekha's position from the right is 20th. After interchanging their positions Jaya becomes 22nd from the left. How many students are there in the row?

(a) 30   (b) 31   (c) 41   (d) 34

53. 864, 420, 200, 96, 40, 16, 6

(a) 420   (b) 200   (c) 96   (d) 40

54. 1, 2, 6, 21, 84, 445, 2676

(a) 2   (b) 6   (c) 21   (d) 84

55. Find the missing term in the following series. 2, 9, 28, 65,?

(a) 121   (b) 195   (c) 126   (d) 103

56. Find out the correct value in place of question mark (?) in the problem figures.
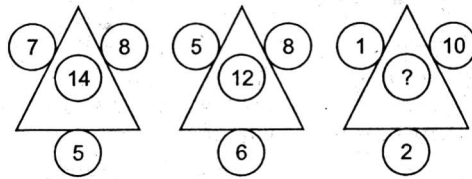
(a) 1   (b) 0   (c) 2   (d) 7

A cuboid of dimensions (4 cm × 3 cm × 3 cm). The block is painted yellow on the pair of opposite surface of dimensions (4 cm × 3 cm). Remaining two opposite surface of dimensions (3 cm × 3 cm) are painted red and two surfaces of dimensions (3 cm × 3 cm) are painted with green colour. Now the blocks is divided into smaller cubes of dimensions (1 cm × 1 cm × 1 cm).

57. In how many cubes all the three colours appear?

(a) 24   (b) 20   (c) 16   (d) 8

58. How many cubes will have atleast one surface painted?

(a) 32   (b) 24   (c) 18   (d) None of these

59. Which of the following dices is identical to the unfolded figure as shown here?
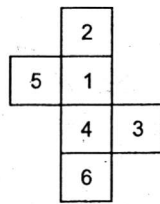
(a)   (b)   (c)   (d)

60. Which symbol will come opposite to symbol □?
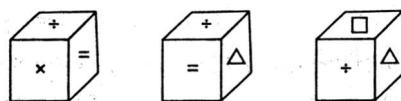
(a) O   (b) =   (c) ×   (d) Δ

PHYSICS

61. 1 Newton is equal to:

   (a) 10^7 dyne   (b) 10^4 dyne   (c) 10^5 dyne   (d) 10^{10} dyne

62. If two masses A and B have their masses in the ratio 1 : 4 and their volumes are equal, then the densities have the ratio

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

63. A force of magnitude 40 N acts on a body, then body acquires an acceleration of 2m/s^2 along the direction of force. The mass of body is:

   (a) 40 kg   (b) 20 kg   (c) 10 kg   (d) 8 kg

64. Bob of a simple pendulum crosses its mean position 50 times in 10 seconds. What would be its time period?

   (a) 10 seconds   (b) 20 seconds   (c) $\dfrac{1}{5}$ seconds   (d) $\dfrac{1}{2.5}$ seconds

65. Friction force is :

   (a) Contact force   (b) Normal force   (c) Muscular force   (d) Gravitational force

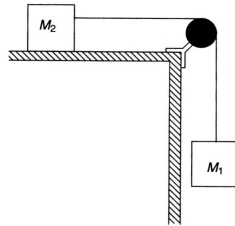**66.** Two unequal masses (M_1 and M_2) are connected by a string which passes over a frictionless pulley (Figure). If M_1, M_2 and the table is frictionless, the acceleration of the masses would be

   (a) $\dfrac{M_1 g}{M_1 + M_2}$ (b) $\dfrac{M_1 + M_2}{M_1 g}$ (c) $\dfrac{M_2 g}{M_1 + M_2}$ (d) none of these

67. Frictional force can not be measured in:

   (a) kg wt.   (b) newton   (c) dyne   (d) kg ms^{-1}

68. Friction in moving parts of a machine can be reduced by using _____ .

   (a) lubricants   (b) ball bearings   (c) iron filings   (d) Both (a) and (b)

69. Kinetic friction force is directly proportional to the:

   (a) external force   (b) normal force

   (c) gravitational force   (d) acceleration due to gravity

70. A and B are two objects with mass 60 kg and 34 kg 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 the above is true

71. Frictional force can't be measured in

   (a) kg wt   (b) newton   (c) dyne   (d) kg ms^{-1}

72. Friction is a/an
   (a) self-adjusting force　　　　　　　(b) necessary evil
   (c) important force in daily life　　　(d) all the above
73. A body of mass M collides against a wall with velocity V and rebounds with the same speed. Its change of momentum is
   (a) zero　　　　(b) MV　　　　(c) 2 MV　　　　(d) –MV
74. Compressions and rarefactions are formed in _____ .
   (a) stationary transverse wave　　　(b) sound wave
   (c) light wave　　　　　　　　　　(d) water wave
75. Water waves on the surface of water are _____ waves.
   (a) transverse　　(b) electromagnetic　　(c) longitudinal　　(d) Both (b) and (c)
76. Which of the following statements is incorrect?
   (a) Sound travels faster in summer than in winter
   (b) Speed of sound is less than speed of light
   (c) Sound travels faster in vacuum than in air
   (d) Sound travels in the form of longitudinal mechanical waves
77. If length of the simple pendulum increases, its time period would-
   (a) decrease　　　　　　　　　　(b) increase
   (c) Remains same　　　　　　　　(d) Becomes zero
78. Both sound and light waves can be propagated through
   (a) vacuum　　(b) air　　(c) Both (a) and (b)　　(d) None of the above
79. Two tuning forks A and B of frequencies 200 Hz are vibrated simultaneously. Then, the ratio of time taken by the sound produced by A and B to travel 660 m and 990 m, respectively in air is _____ (velocity of the sound in air = 330 m s^{-1})
   (a) 1 : 2　　　(b) 1 : 3　　　(c) 2 : 3　　　(d) 1 : 1
80. When an object is moved away from a convex mirror, the image
   (a) becomes smaller　　　　　　　(b) moves closer to the focus
   (c) becomes inverted　　　　　　　(d) Both (a) and (b)

CHEMISTRY

81. Metal which does not react with dil. HCl is :
   (a) Mg　　　　(b) Cu　　　　(c) Na　　　　(d) Fe
82. An element used in computers, T.V etc. due to its semiconductor properties is :
   (a) Nitrogen　　(b) Silicon　　(c) Bromine　　(d) Carbon
83. Cinnabar is an ore of:
   (a) Zn　　　　(b) Hg　　　　(c) Cu　　　　(d) Al
84. In foam type fire extinguisher .... is responsible to put off fire.
   (a) H_2O　　(b) $CO_2 + H_2O$　　(c) CO_2　　(d) CO
85. The composition of water gas is :
   (a) $CO + O_2$　　(b) $CO + H_2$　　(c) $CO_2 + H_2$　　(d) $O_2 + H_2 + C$
86. Aqua regia is a mixture of :

(a) three parts of concentrated nitric acid and one part of concentrated hydrochloric acid.

(b) three parts of concentrated hydrochloric acid and one part of concentrated nitric acid.

(c) three parts of dilute hydrochloric acid and one part of dilute nitric acid.

(d) three parts of dilute nitric acid and one part of dilute hydrochloric acid.

87. Which of the following fuel has highest calorific value ?

(a)   Coal   (b) Petrol   (c) CNG   (d) Hydrogen

88. An amalgam of metal contains _____.

(a)   C   (b) Ag   (c) Mg   (d) Hg

89. $X + CuSO_4 \rightarrow XSO_4 + Cu$

$Y + CuSO_4 \rightarrow YSO_4 + Cu$

Identify X and Y in the above two reactions.

(a)   Zn, Ag   (b) Zn, Fe   (c) Fe, Ag   (d) Ag, Al

90. Petroleum is refined by :

(a) fractional distillation   (b) destructive distillation

(c) distillation   (d) evaporation

91. In LPG cylinder, the gas is liquefied by :

(a) Increasing volume   (b) Applying pressure

(c) Increasing temperature   (d) Decreasing pressure

92. An element X reacts with water to form a solution which turns phenolphthalein indicator pink. The element X is most likely to be:

(a)   Sulphur   (b) Sodium   (c) Carbon   (d) Silicon

93. When a vessel is exposed to moist air for a long time, then a green coating is formed on its surface. The vessel must be made of:

(a)   Zinc   (b) Magnesium   (c) Iron   (d) Copper

94. 'Alclad' is perfectly resistant to corrosion by sea water. The alloy is :

(a)   Magnalium coated with aluminium   (b) Duralumin coated with aluminium

(c)   an alloy of aluminium   (d) a mixture of magnalium and duralumin

95. Metals are ductile, i.e. they can be drawn into thin wires. Gold, silver, copper and aluminium are highly ductile metals.

Which of the following metals breaks into pieces when it is hammered?

(a)   Zinc   (b) Magnesium   (c) Iron   (d) Platinum

96. Sulphur on reaction with HNO_3 gives _____.

(a) H_2SO_4, NO_2, H_2O (b) H_2SO_3, NO_2, H_2O

(c) H_2SO_4, NO, H_2O (d) H_2SO_3, NO, H_2O

97. Which of the following represents the correct match for items in Column A with those in Column B?

	Column A		Column B
I.	Nylon	(i)	Thermoplastic
II.	PVC	(ii)	Thermosetting plastic
III.	Bakelite	(iii)	Fibre

(a) I(ii), II(iii), III(i)   (b) I(iii), II(i), III(ii)   (c) I(ii), II(i), III(iii)   (d) I(iii), II(ii), III(i)

98. Which of the following indicates the water pollution?

(a) Eutrophication

(b) Increase in BOD

(c) Increase in COD

(d) All of these

99. Match the items given in Column I with the items of Column II.

	Column I		Column II
A	Used for road surfacing	I	Black gold
B	Natural Gas	II	Vaseline and candles
C	Petroleum	III	Bitumen
D	Paraffin Wax	IV	CNG

(a) A → III, B → IV, C → I, D → II

(b) A → III, B → IV, C → II, D → I

(c) A → III, B → I, C → IV, D → II

(d) A → III, B → II, C → IV, D → I

100. Which of the following groups contain all synthetic substances?

(a) Nylon, Terylene, Wool

(b) Cotton, Polycot, Rayon

(c) PVC, Polythene, Bakelite

(d) Acrylic, Silk, Wool

BIOLOGY

101. One of the following does not possess nuclear membrane in its cells. Identify it.

(a) *Chlamydomonas*

(b) Blue-green algae

(c) *Riccia*

(d) *Cycas*

102. The main function of leucoplastid is:

(a) photosynthesis

(b) storage

(c) imparting colour to the plant parts

(d) Both (b) and (c)

103. Which of the following is a closely related character of *Euglena* with higher plants?

(a) Presence of a flexible pellicle made of protein.

(b) They have an eye spot, astaxanthin bearing pigment.

(c) Euglenoids bear one or two flagella.

(d) Chlorophyll is localised in chloroplasts.

104. Rod-shaped bacteria are called as:

(a) cocci

(b) vibrio

(c) spirillum

(d) bacilli

105. The practice of growing two or more crops together in a proper pattern is called:

(a) monocropping

(b) crop rotation

(c) mixed cropping

(d) inter cropping

106. A common preservative used in jam and pickles is:

(a) Sodium benzoate

(b) Nitric acid

(c) Sodium chloride

(d) Copper sulphate
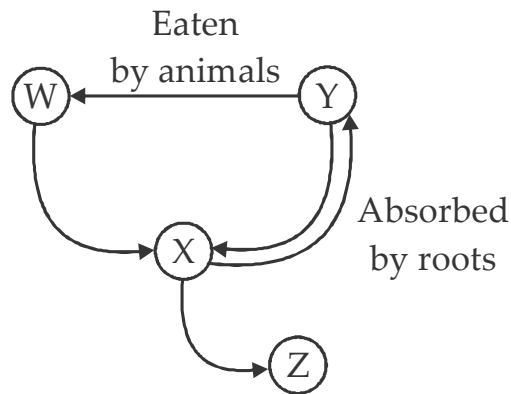
107. A nucleotide is made up of:

(a) Nitrogenous bases only

(b) Phosphate and nitrogenous bases

(c) Phosphate and sugar   (d) Nitrogenous bases, phosphate and sugar

108. The figure given below shows a part of nitogen cycle.

Which of the following represent nitrates?

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

109. Which of the following is/are exotic breed(s) of cow?

(a) Jersey   (b) Brown swiss   (c) Sahiwal   (d) Both (a) and (b)

110. Which of the following is a denitrifying bacteria?

(a) *Rhizobium*   (b) *Azotobacter*   (c) *Nitrobacter*   (d) *Pseudomonas*

111. Eutrophication is caused by :-

(a) Excessive use of fertilizers   (b) Excessive growing of crops

(c) Monocropping   (d) None of the above

112. Other name of operation flood is :-

(a) Green revolution   (b) White revolution

(c) Silver revolution   (d) None of the above

113. The principal cereal crop in India is :-

(a) Wheat   (b) Rice   (c) Maize   (d) Sorghum

114 Livestock refers to :-

(a) Pet animals.

(b) Poultry and pet animals.

(c) Domestic animals which are kept for use or profit.

(d) None of the above.

115 Which of the following disease is not caused by viruses?

(a) Small pox   (b) Polio   (c) Measles   (d) Typhoid

116 Amoebic dysentery is a disease.

(a) Viral   (b) Bacterial   (c) Protozoan   (d) Fungal

117 Which of the following diseases can be prevented by vaccination?

(a) Cholera   (b) Typhoid   (c) Measles   (d) All of these

118. Which microorganism causes diseases like measles, mumps, and hepatitis B ?

(a) Bacteria   (b) Virus   (c) Protozoan   (d) Fungi

119. Microorganisms are :

(a) Both living and non living organisms we cannot see.

(b) Both living and non living organisms we can see with the help of microscope.

(c) Non living organisms that can only be seen through microscope.

(d) Living organisms that can only be seen through microscope.

120. Tuberculosis is caused by:

(a) Virus   (b) Protozoan   (c) Blue green algae   (d) Bacteria

MATHEMATICS

121. An odd number when multiplied by itself gives 2401. Find the number.

(a) 41   (b) 39   (c) 49   (d) 51

122. $\sqrt[3]{\dfrac{-a^6 \times b^3 \times c^{21}}{c^9 \times a^{12}}}$ = _____ .

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

123. If a = 2b and b = 4c, then $\sqrt[3]{\dfrac{a^2}{16bc}}$ = _____ .

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

124. If $\sqrt{x} + \dfrac{58}{\sqrt{x}}$ = 31, then which of the following can be the value of x?

(a) 529   (b) 931   (c) 729   (d) 841

125. $\sqrt[3]{1 + 3 + 5 + 7 + \ldots + 53}$ = _____ .

(a) 11   (b) 13   (c) 7   (d) 9

126. If n leaves a remainder 1 when divided by 2, then n^3 leaves a remainder of _____, when divided by 2.

(a) 1   (b) 2   (c) 0   (d) 3

127. The least number to be substracted from 220 so that it becomes a perfect cube is _____ .

(a) 4   (b) 10   (c) 16   (d) 20

128. The square root of $(xy + xz - yz)^2 - 4xyz(x - y)$ is _____ .

(a) xy + yz − 2xyz   (b) (x + y − 2xy)   (c) (xy + 3 − y)   (d) (xy + yz − zx)

129. The square root of $x^{m^2-n^2} . x^{n^2 + 2mn} . x^{n^2}$ is

(a) x^{m+n} (b) $x^{(m+n)^2}$ (c) $x^{(m+n)/2}$ (d) $x^{\frac{1}{2}(m+n)^2}$

14

130. The square root of $y^2 + \dfrac{1}{y^2} + 2$ is

(a) $y + \dfrac{1}{y}$ (b) $y - \dfrac{1}{y}$ (c) $y^2 + \dfrac{1}{y^2}$ (d) $y^2 - \dfrac{1}{y^2}$

131. In the set of rational numbers, multiplicative identity is _____ and the additive identity is _____ .

(a) 0, 1   (b) 1, 1   (c) 0, 0   (d) 1, 0

132. Find the HCF of the first 100 natural numbers.

(a) 2   (b) 100   (c) 1   (d) 10

133. Which of the following statements is true?

(a) The product of two irrational numbers is always irrational

(b) The sum of two irrational numbers is always irrational

(c) The product of two irrational numbers is always rational

(d) None of these

134. If the numbers a − b and a + b are twin primes, then a and b are necessarily _____ .

(a) Twin primes   (b) Co-primes   (c) Cannot say   (d) Primes

135. There are 20 balls. The balls are numbered consecutively starting from any one of the numbers from 1 to 20. For any case, the sum of the numbers on all the balls will be a/an _____ .

(a) Odd number   (b) Even number   (c) Prime number   (d) Whole number

136. Find the solution of the inequality $\dfrac{1}{|3x-5|} > 2,$ where x is a positive integer.
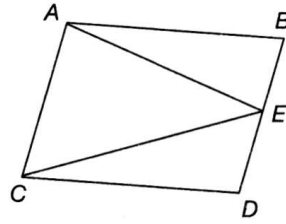
(a) {2, 3}   (b) {2, 3, 4}   (c) x = 2   (d) Null set

137. In the following, CDEF is a cyclic quadrilateral. $\overline{CG}$ and $\overline{DH}$ are the angle bisectors of $\angle C$ and $\angle D$ respectively. If $\angle E = 100°$ and $\angle F = 110°$, then find $\angle CPD$.
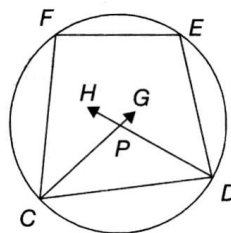
(a) 105°   (b) 80°   (c) 150°   (d) 90°

138. In the following figure (not to scale), $\overline{AB} \parallel \overline{CD}$. If $\angle BAE = 25°$ and $\angle DCE = 30°$, then find $\angle AEC$.
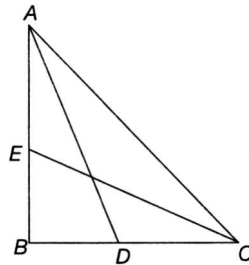
(a) 30°   (b) 45°   (c) 50°   (d) 55°

139. n! = n(n – 1) (n –2) ... 3 × 2 × 1

Find $\dfrac{5!}{3!}$
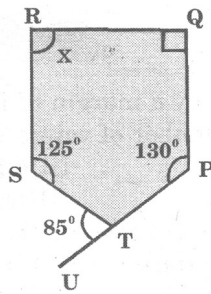
(a) 7   (b) 20   (c) $\dfrac{5}{3}$ (d) None of these

140. In the given figure (not to scale), E and D are the mid-points of AB and BC respectively. Also, $\angle B = 90°$, AD = $\sqrt{292}$ cm and CE = $\sqrt{208}$ cm. Find AC.

(a) 15   (b) 18   (c) 20   (d) 24

141. In the figure given below, PTU is a straight line.

What is the value of x?

(a) 100°   (b) 110°   (c) 120°   (d) 90°

142. Each side of a triangle is multiplied with the sum of the squares of the other two sides. The sum of all such possible results is 6 times the product of the sides. The triangle must be ____.

(a) Equilateral   (b) Isosceles   (c) Scalene   (d) Right-angled

143. The volume of a cube which can be inserted exactly in a sphere of radius $\dfrac{3}{2}\sqrt{3}$ cm is ____.

(a) 24 cm³   (b) 27 cm³   (c) 18 cm³   (d) 22 cm³

144. Area of a trapezium is 1050 cm². One of its parallel sides is 50 cm and the distance between
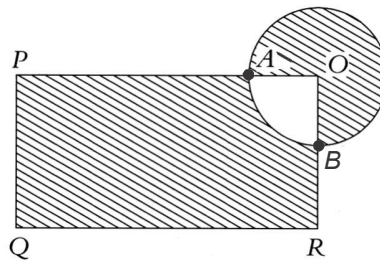
the parallel sides is 30 cm. Find the length of the other parallel side (in cm).

(a) 24   (b) 20   (c) 15   (d) 26

145. Simplified form of $\left\{ \sqrt[4]{\left(\dfrac{1}{x}\right)^{-12}} \right\}^{-2/3}$ is :

(a) x^{-2} (b) $\dfrac{1}{x^{-2}}$ (c) $\dfrac{1}{x}$ (d) x^{-1}

146. In the figure given below, O is the centre of the circle and QPOR is rectangle. A is point on PO such that AO = $\dfrac{1}{3}$ PO and B is the midpoint of OR. Find the area of the shaded region if PA = 8 cm and BR = 4 cm (use π = 3.14).

(a) 132.68 cm²   (b) 121.12 cm²   (c) 108.56 cm   (d) 116.44 cm²

147. The radius and slant height of a cone are in the ratio 8 : 17. If its curved surface area is 544 πcm², then find its volume.

(a) 2560 πcm³   (b) 4800 πcm³   (c) 3468 πcm³   (d) 4206 πcm³

148. The sides of a triangle are 45 cm, 60 cm, and 75 cm. Find the length of the altitude drawn to the longest side from its opposite vertex (in cm).

(a) 27   (b) 21   (c) 39   (d) 36

149. Find the volume (in cm³) of a sphere which is exactly inserted inside a cube of side 6 cm.

(a) 288 π   (b) 144 π   (c) $64\sqrt{3}$ π   (d) 36 π

150. $2^x = 3^y = 6^{-z}$ then find out the value of $\dfrac{1}{x} + \dfrac{1}{y} + \dfrac{1}{z} = ?$

(a) 0   (b) −1   (c) 1   (d) Can't be determined