STUDY VAULT
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School Integrated Program

Class – IX

ENTRANCE TEST CUM SCHOLARSHIP (SAMPLE PAPER-2)

[Time: 3 Hours] [Max Marks: 450]

A. General:

1. This booklet is your 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 / MULTIPLE 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:

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.

MAT

Directions: (Q. Nos. 1-9) select the related letters/word/number from the given alternatives.

1. PQR : CBA : : ?
   (a) MNO : UVW (b) GIH : DFE (c) SUT : VWX (d) LMN : ZYX
2. AZBY : ? : : EVFU : GTHS
   (a) CWXD (b) CXDW (c) CDWX (d) CXWD
3. ZXVT : ? : : MKIG : NPRT
   (a) DCBA (b) ACEG (c) ABCD (d) CXWD
4. 25 : 125 : : 36 : ?
   (a) 180 (b) 206 (c) 216 (d) 318
5. BEGK : ADFJ : : PSVY : ?
   (a) ROUX (b) ORUX (c) LQUT (d) LOQT
6. BDFH : SUWY : : CEGI : ?
   (a) QTWZ (b) PTVX (c) JLNP (d) TVXZ
7. Spiritual : Belief : : Orchestral : ?
   (a) Theatre (b) Situation (c) Music (d) Direction
8. Finger : Hand : : ?
   (a) Chair : Table (b) Cycle : Wheels (c) Bank : Money (d) Month : Year
9. Length : Metre : : Power : ?
   (a) Calorie (b) Degree (c) Watt (d) Kilogram

Directions: (Q. Nos. 10-15) find the odd word/number/letters/number pair from the given alternatives.

10. (a) VWY (b) QRT (c) LMO (d) JKL
11. (a) AB (b) CD (c) EF (d) GI
12. (a) CX (b) DW (c) JQ (d) LR
13. (a) Pathology (b) Geology (c) Cardiology (d) Radiology
14. (a) 24 (b) 49 (c) 80 (d) 15
15. (a) 704, 11 (b) 256, 4 (c) 832, 13 (d) 310, 5

Directions: (Q. Nos. 16-20) a series is given, with one term missing. Choose the correct alternative from the given ones that will complete the series.

16. AZ YB CX ?
    (a) WD (b) DW (c) QA (d) UJ
17. 10, 43, 175, ?, 2815
    (a) 703 (b) 1320 (c) 315 (d) 633
18. cdeb, ceed, cfef, cgeh, ?
    (a) chej (b) chik (c) chjk (d) cghj

19. BCFG, JKNO, RSVW, ?

(a) STUX (b) HIKL (c) ZADE (d) MNPQ

20. CIM, HNR, MSW, ?

(a) SXA (b) UYB (c) RXB (d) ZEH

21. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete the series?

a_cbc_ca_ab_bca_ab

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

22. Mohit walks a distance of 5 km towards South, then turns to his right and walks 3 km. He again turns right and walks 5 km. He then turns to his left and walks 5 km. How far is he from the starting point and in what direction?

(a) 5 km and West (b) 3 km and North (c) 3 km and East (d) 8 km and West

23. In certain code, RAGHAVAN is written as GARVAHNA. In that code which word will be written as MATHAVAN?

(a) MATVAHNA (b) TAMVAHAN (c) TAMHAVNA (d) TAMVAHNA

24. If 38 + 15 = 66 and 29 + 36 = 99, then 82 + 44 = ?

(a) 77 (b) 88 (c) 80 (d) 94

25. If + means ÷, – means ×, × means +, ÷ means –, given the value for

45 + 9 – 3 × 15 ÷ 2

(a) 40 (b) 36 (c) 56 (d) 28

26. A man started from a place and walked towards North for 5 km then turned 90° to his right and walked another 5 km. Then he turned 45° to his right and walked 2 kms and turned 45° to his left. What is his direction now?

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

Directions: (Q. Nos. 27-28) select the missing number from the given responses.

27.

7	8	6
4	9	5
3	2	?
25	70	29

(a) 9 (b) 1 (c) 8 (d) 5

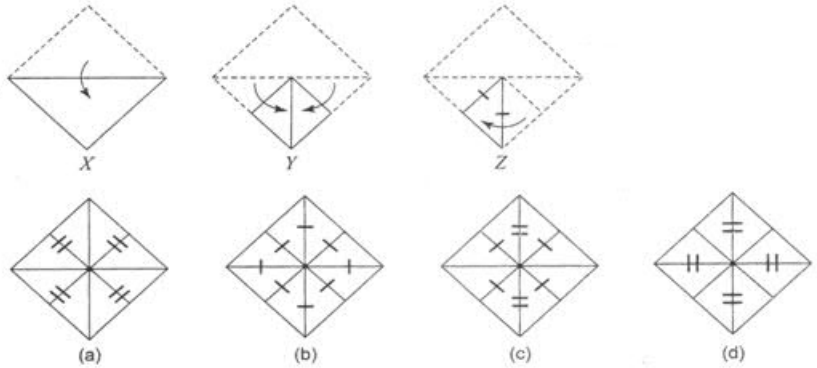
28.

3	4	5
6	7	8
9	1	2
57	11	?

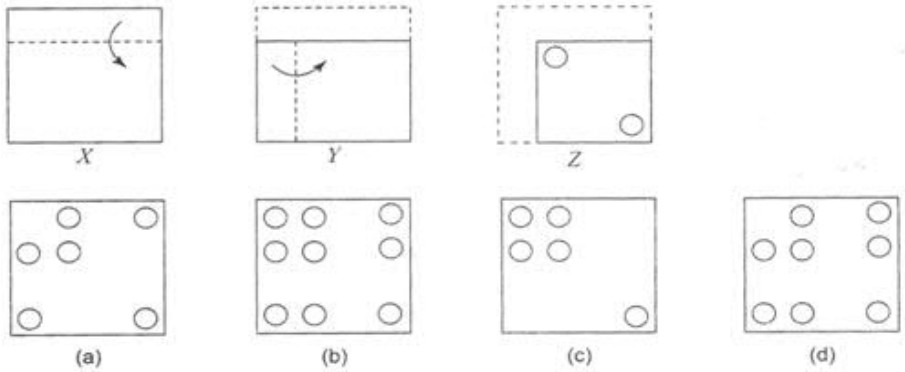
(a) 42 (b) 21 (c) 11 (d) 18

Directions: (Q. Nos. 29-30) choose a figure out of (a), (b), (c) and (d) which would most closely resemble the unfolded form of figure Z.

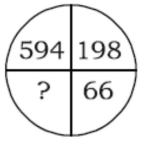
29.



30.



31. Insert the missing number

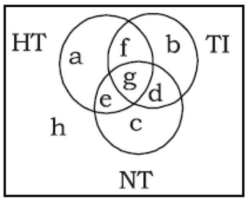


(a) 22 (b) 33 (c) 11 (d) 44

32. If the letters in PRABA are coded as 27595 and THILAK are coded as 368451, how can BHARATI be coded?

(a) 9657538 (b) 9567538 (c) 9675538 (d) 9567568

33. The below Venn diagram shows a city population which read three popular daily newspapers Hindustan Times (HT), The Times of India (TI) and Navbharat Times (NT) :



If a person is randomly selected from the city population and it is found that he reads at least one of the three newspapers then the person belongs to which part of the population?

(a) g (b) a + b + c (c) P - h (d) P - g

34. If in a code language PARENT is written as BDFGJK and CHILDREN is written as MOXQUFGJ, how is REPRINT written in that code?

(a) FGBFXGD (b) BGBFXJK (c) FGBUXJK (d) FGBFXJK

Directions: (Q. Nos. 35-37) : Read the information given below and answer the following questions:

P is the father of R, but R is not his son. T is the daughter of R. U is the wife of P. Q is the brother of R. S is the son of Q. V is the wife of Q. W is the father of V.

35. Who is the grandmother of S?

(a) W (b) P (c) R (d) U

36. Who is the son of U?

(a) Q (b) R (c) T (d) S

37. Who is the father-in-law of Q?

(a) R (b) P (c) T (d) W

38. Gita is 314 days elder to Suman, while Sapna is 70 weeks elder to Gita. If Sapna was born on Thursday, then on which day Suman was born?

(a) Friday (b) Tuesday (c) Saturday (d) Wednesday

39. At what time between 10 and 11 O'clock will the hand of clock be at right angle?

(a) $38\frac{2}{11}$ min past (b) $6\frac{5}{11}$ min past (c) $38\frac{3}{11}$ min past (d) $8\frac{2}{11}$ min past

40. Four person A, B, C and D are sitting along the different sides of a table. B is sitting towards left of A, C who is facing West, is sitting to the right of D. Who is facing South?

(a) A (b) B (c) B or D (d) Data inadequate

Directions : (Q. Nos. 41-44), select the missing letters/word/numbers from the given alternatives.

41. WYV, ?, IKH, BDA

(a) OPR (b) ROP (c) PRO (d) OQN

42. 3, 15, ?, 63, 99, 143

(a) 27 (b) 45 (c) 35 (d) 56

43. 2, 3, 6, 7, 14, 15, ?

(a) 16 (b) 30 (c) 31 (d) 32

44. 3120, ?, 122, 23, 4

(a) 4888 (b) 621 (c) 610 (d) 732

Directions : (Q. Nos. 45-46): In eaach of the following questions two pairs of numbers on either side of the sign **"**: :**"** is given, out of which one number in either pair is missing. Numbers in each pair are connected in the same way. Identify the correct number which can take place the missing number.

45. $\frac{3}{7} : \frac{14}{6} :: \frac{5}{2} : ?$

(a) $\frac{4}{10}$ (b) $\frac{3}{5}$ (c) $\frac{1}{4}$ (d) 5

46. $\sqrt{\frac{3}{2}} : 3\sqrt{3} :: \sqrt{\frac{2}{3}} : ?$

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

Directions : (Q. Nos. 47-49): In each of the following questions, you are given a combination of alphabets and/or numbers followed by four alternatives (a), (b), (c) and (d). Choose the alternative which most closely resembles the mirror-image of the given combination.

47. WHITE

(a) ƎLIHW (b) ƎTIHM (c) ƎTIHW (d) ETIHW

48. BRISK

(a) ꓘSIRB (b) ꓘSIRB (c) KSIRB (d) ꓘSIRB

49. PAINTED

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

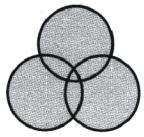
50. Five boys A, B, C, D and E are sitting in a row. A is adjacent to E. E is in middle of the row. A is not adjacent to B or C. Then D is adjacent to whom ?

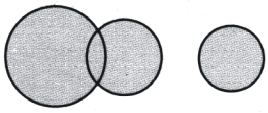
(a) C (b) A (c) B (d) D

51. Six students including P are sitting on two benches in two rows, three in each as the following: Q is the neighbour of U, and R is the neighbour of T. S is second to the left of U. R is sitting diagonally opposite to S. T is not at the end of any row. Who is facing Q ?

(a) T (b) S (c) Q (d) R

Directions : (Q. Nos. 52-54): Each of the questions given below contains three classes of items. There may or may not be the relationship amongst these three. You are to choose one of the diagrams out of (a), (b), (c) and (d) that can fit regarding the relationship for the three classes.

(a) 

(b) 

(c) 

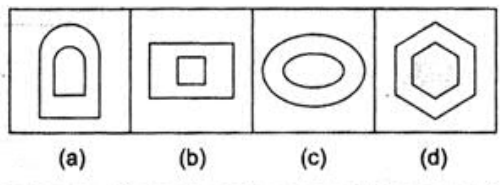
(d) 

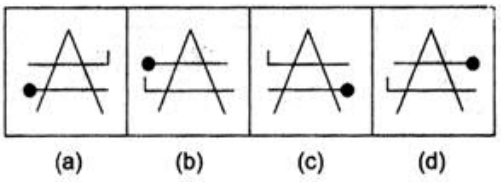
52. Table, Chair, Furniture

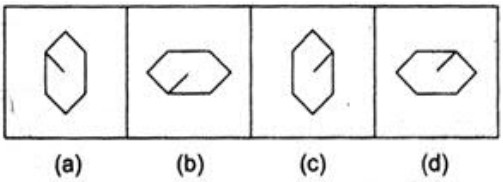
53. Husbands, Brothers, Fathers

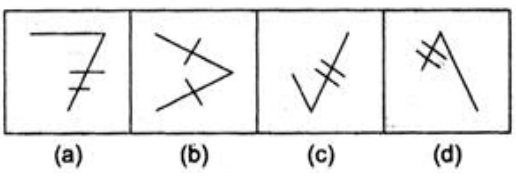
54. Letter, Sentence, Word

Directions : (Q. Nos. 55-58): Find the odd-one-out.

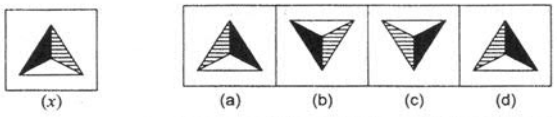
55. 

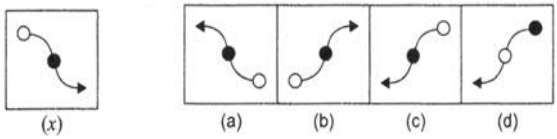
56. 

57. 

58. 

Directions : (Q. Nos. 59-60) In each of the following questions, choose the correct mirror image of the figure (x) from amongst the four alternatives (a), (b), (c) and (d).

59. 

60. 

PHYSICS

61. For the motion on a straight line path with constant acceleration, the ratio of the magnitude of the displacement to the distance covered is
(a) = 1 (b) > 1 (c) < 1 (d) ≤ 1

62. A train moving on linear way travels a distance 'D' at constant velocity of 30 km/h, then it travels in opposite direction with same distance and reaches at original station at a constant velocity of 45 km/h. What is the average speed of train ?
(a) 36 km/h (b) 10 km/h (c) 0 km/h (d) 75 km/h

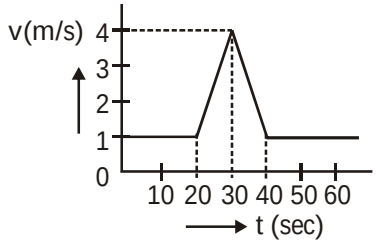
63. An insect moves along the sides of a wall of dimensions 12 m × 5 m starting from one corner and reaches the diagonally opposite corner. If the insect takes 2 s for its motion then find the ratio of average speed to average velocity of insect.
(a) 15 : 4 (b) 1 : 1 (c) 12 : 7 (d) 17 : 13

64. A stone is dropped into a well in which the level of water is h, below the top of the well. If v is velocity of sound, then time T after which the splash is heard is equal to
(a) $\frac{2h}{v}$ (b) $\sqrt{\frac{2h}{v}}+\frac{h}{g}$ (c) $\sqrt{\frac{2h}{g}}+\frac{h}{v}$ (d) $\sqrt{\frac{h}{2g}}+\frac{2h}{v}$

65. A bullet going with speed 150 m/s enters in a concrete wall and penetrates a distance of 15 cm before coming to rest. The retardation that offered by the wall is
(a) 15×10^4 m/s^2 (b) 7.5×10^4 m/s^2 (c) 3.75×10^4 m/s^2 (d) 30×10^4 m/s^2

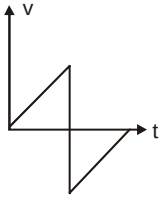
66. If two bodies of different masses m_1 and m_2 are dropped from different heights h_1 and h_2, then ratio of the time taken by the two to drop through these distances is
(a) $h_1 : h_2$ (b) $h_2 : h_1$ (c) $\sqrt{h_1} : \sqrt{h_2}$ (d) $h_1^2 : h_2^2$

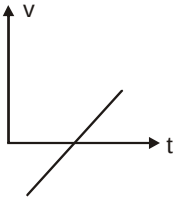
67. Velocity time (v - t) graph for a moving object is shown in the figure. Total displacement of the object during the time interval when there is non-zero acceleration and retardation is

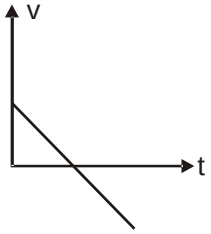


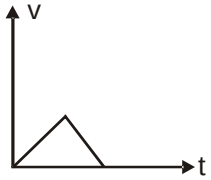
(a) 60 m (b) 50 m (c) 30 m (d) 40 m

68. The velocity-time graph of a body falling from rest under gravity and rebounding from a solid surface is represented by which of the following graphs?

(a) 

(b) 

(c) 

(d) 

69. An aeroplane revolves in a horizontal circle above the surface of the earth with a uniform speed of 100 km/hr. The change in velocity (in km/hr) after completing 1/2 revolution is

(a) 200 (b) 0 (c) 300 (d) 400

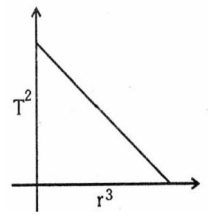
70. The escape velocity from the earth is about 11.2 kms^{-1}. The escape velocity from the planet having thrice the radius and the same mean density will be

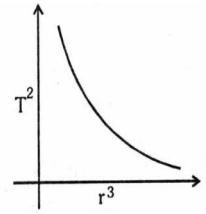
(a) 33.6 kms^{-1} (b) 11 kms^{-1} (c) 11.2 kms^{-1} (d) 22.4 kms^{-1}

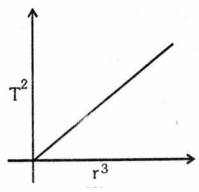
71. The escape velocity from the earth's surface is V_e. The velocity of a satellite while orbiting just above the earth's surface is V_0. Then the relation between these velocities is

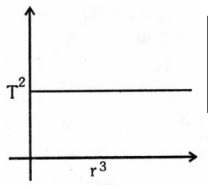
(a) $V_2 = \sqrt{2}V_0$ (b) $V_e = \frac{1}{\sqrt{2}}V_0$ (c) $V_e = V_0$ (d) $V_e = 2V_0$

72. Which of the following graphs is true for the motion of a satellite revolving round the earth ? ('T' is the time period of a satellite and 'r' is the distance of the satellite from the centre of the earth)

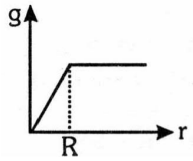
(a) 

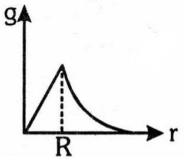
(b) 

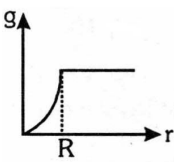
(c) 

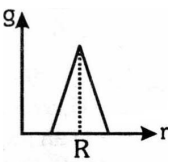
(d) 

73. Variation of 'g' w.r.t. height or depth is correctly represented by

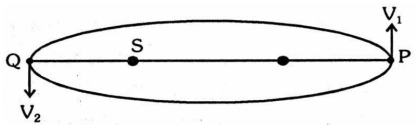
(a) 

(b) 

(c) 

(d) 

74. The figure shown below is an elliptical orbit along which a planet revolves round the sun at S. Let the velocity of planet at P and Q positions be V_1 and V_2 respectively. Then, the possible relationship between magnitudes of V_1 and V_2 is:



(a) $V_1 < V_2$ (b) $V_1 = V_2$ (c) $V_1 > V_2$ (d) Cannot be determined

75. g_e and g_p denote the acceleration due to gravity on the surface of the earth and another planet whose mass and radius are twice that of the earth. Then

(a) $g_p = g_e$ (b) $g_p = g_e/2$ (c) $g_p = 2g_e$ (d) $g_p = \frac{g_e}{\sqrt{2}}$

76. Two bodies 'A' and 'B' having masses 'm' and '2m' respectively are kept at a distance 'd' apart. A small particle is to be placed so that the net gravitational force on it, due to the bodies A and B, is zero. Its distance from the mass A should be

(a) $x = \frac{d}{1+\sqrt{2}}$ (b) $x = \frac{d}{1+\sqrt{4}}$ (c) $x = \frac{d}{1+\sqrt{3}}$ (d) $x = \frac{d}{1+\sqrt{6}}$

77. In the relation $F = \frac{GMm}{r^2}$, the quantity G

(a) depends on the value of g at the place of observation

(b) is used only when the earth is one of the two masses

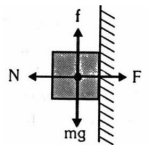
(c) is greatest at the surface of the earth

(d) is universal constant of nature

78. Maximum value of static friction is called:

(a) normal friction (b) coefficient of friction (c) rolling friction (d) limiting friction

79. A block of mass 0.1 kg is held against a wall by applying a horizontal force of 5 N on the block (see fig.). If the coefficient of friction between the block and the wall is 0.5, the magnitude of frictional force acting on the block is ($g = 9.8\ m/s^2$)



(a) 2.5 N (b) 0.98 N

(c) 4.9 N (d) 0.49 N

80. A block of weight 10 N is resting on a horizontal surface. The coefficient of static friction between the block and the surface $\mu_s = 0.4$. A force of 3.5 N will keep the block in uniform motion, once it has been set in motion. A horizontal force of 3 N is applied to the block, then the block will

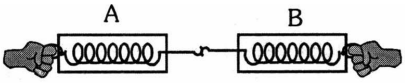
(a) Move over the surface with constant velocity

(b) Move having accelerated motion over the surface.

(c) Not move.

(d) First move with a constant velocity for some time and then will have accelerated motion

81. Consider two spring balances hooked as shown in the figure. We pull them in opposite directions. If the reading shown by A is 1.5 N, the reading shown by B will be



(a) 1.5 N (b) 2.5 N

(c) 3.0 N (d) Zero

82. Assertion : Action reaction forces act on two different objects.

Reason : Action and reaction have zero resultant.

(a) Both assertion and reason are correct and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false.

(d) Assertion is false but reason is true.

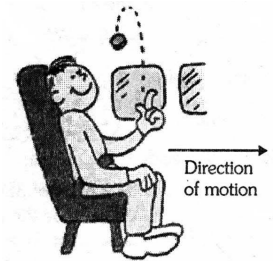
83. A bullet of mass A and velocity B is fired into a block of wood of mass C. If loss of any mass and friction be neglected, the final velocity of the system must be

(a) $\frac{AB}{A+C}$ (b) $\frac{A+C}{B+C}$ (c) $\frac{AC}{B+C}$ (d) $\frac{A+B}{AC}$

84. An object A of mass 2 kg is moving with a velocity of 3 m/s and collides head-on with an object B of mass 1 kg moving in opposite direction with a velocity of 4 m/s. After collision, both objects coalesce so that they move with a common velocity equal to

(a) 3 m/s (b) 2 m/s (c) 1 m/s (d) $\frac{2}{3}$ m/s

85. Suppose you are travelling in a high speed train like Jan Shatabdi express which is travelling with uniform acceleration. If you flip a coin as shown in the figure, you will observe that



(a) the coin does not reach again in your hand.

(b) the coin reaches again in your hand.

(c) the coin falls behind you.

(d) the coin falls in front of you.

86. A force of 100 N acts on a ball moving on a surface. The force of friction that must act between the surface of the ball and the surface so that the ball keeps on moving with constant velocity over the surface must be

(a) Zero (b) 100 N (c) 200 N (d) 300 N

CHEMISTRY

87. Number of valence electrons in carbon is

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

88. Which of the following species are isoelectronic?

(a) CO and CN^- (b) CO_3^{2-} and SO_3 (c) NO_3^- and NH_4^+ (d) HCl and SO_4^{2-}

89. The ratio between the neutrons present in nitrogen atom and silicon atoms with mass number 14 and 28 is:

(a) 7:3 (b) 3:7 (c) 1:2 (d) 2:1

90. Sulphate and thiosulpahe ions are

(a) SO_4^{2-} and SO_3^{2-} (b) SO_4^{2-} and $S_2O_3^{2-}$ (c) SO_3^{2-} and SO_4^{2-} (d) $S_2O_3^{2-}$ and SO_4^{2-}

91. Symbol of the element "Tungsten" is

(a) W (b) Tu (c) Ti (d) Sn

92. Formula of ammonium oxalate is

(a) $(NH_4)_2C_2O_4$ (b) $(NH_4)(C_2O_4)_2$ (c) $(NH_4)_2Cr_2O_4$ (d) $(NH_4)_2Cr_2O_7$

93. Which method can be used to separate the mixture of sodium chloride and ammonium chloride?

(a) Sublimation (b) Evaporation (c) Distillation (d) Filtration

94. Two miscible liquids which have boiling points that differ by less than 25 °C can be separated using

(a) Simple distillation (b) Fractional distillation

(c) Evaporation (d) Decantation

95. One Mole is equal to number of

(a) molecules present in 2 g dihydrogen gas (b) molecules present in 14 g of dinitrogen gas

(c) molecules present on 1 L oxygen gas at STP (d) all of these

96. Hydrogen reacts with oxygen to form water (H_2O). The ratio between masses of Hydrogen and oxygen is -

(a) 1 : 8 (b) 63.5 : 8 (c) 2 : 1 (d) 63.5 : 16

97. The mass of 1 u is equal to .....g.

(a) $1/(12\times 6.022 \times 10^{23})$ (b) $1/(6.022 \times 10^{23})$ (c) $12/(6.022 \times 10^{23})$ (d) 6.022×10^{23}

98. Calculate the weight in gram of 0.9 gram atoms of zinc. [Atomic weight of Zn = 65]

(a) 50.5 g (b) 58.5 g (c) 56.3 g (d) 52.3 g

99. When a neutral atom is converted into anion its

(a) Size increase (b) Size decrease

(c) Atomic number increases (d) Atomic number decreases

100. How many atoms and how many gram atoms are there in 10 grams of calcium?

(a) 0.25 gram atoms, 6.023×10^{-23} atoms (b) 0.25 gram atoms, 1.50×10^{23} atoms

(c) 0.1 gram atoms, 6.023×10^{23} atoms (d) 0.1 gram atoms, 1.50×10^{-23} atoms

101. Which of the following atoms do not have neutrons?

(a) Protium (b) Deuterium (c) Tritium (d) Lithium

102. Which of the following electronic configurations belongs to Chromium atom?

(a) [Ar] $3d^5\ 4s^1$ (b) [Ar] $3d^4\ 4s^2$ (c) [Ar] $3d^{10}\ 4s^1$ (d) [Ar] $3d^9\ 4s^2$

103. Hydrogen and oxygen combine to form H_2O_2 and H_2O containing 5.93% and 11.2 % hydrogen respectively. The data illustrates :

(a) Law of conservation of mass (b) Law of constant proportion

(c) Law of reciprocal proportion (d) Law of multiple proportion

104. A sample of ammonium phosphate, $(NH_4)_3\ PO_4$, contains 6 moles of hydrogen atoms. The number of moles of oxygen atoms in the sample is

(a) 1 (b) 2 (c) 4 (d) 6

105. Which of the following contains the largest mass of hydrogen atoms?

(a) 5.0 moles $C_2H_2O_4$ (b) 1.1 moles $C_3H_8O_3$ (c) 1.5 moles $C_6H_8O_6$ (d) 4.0 moles $C_2H_4O_2$

106. Which of the following is not an emulsion?

(a) Milk (b) Egg yolk (c) Butter (d) cheese

107. How many grams of NaOH would need to be dissolved in 250.0 mL of solution to produce a 1.25 M solution?

(a) 12.5 g (b) 20.4 g (c) 40.00 g (d) 1.25 g

108. Elements X and Y forms a compound in which there is one atom of X for every four atoms of Y. When these elements react, it is found that 1.00 g of X combines with 5.07 g of Y. When 1.00 g of X combines with 1.14 g of O, it forms a compound containing two atoms of O for each atom of X. Calculate the atomic mass of Y.

(a) 35.6 u (b) 42.5 u (c) 356 u (d) 425 u

109. Concentrated sulphuric acid is 96.0% H_2SO_4 by mass calculate the number of moles of H_2SO_4 in 1.00 L of concentrated sulphuric acid if the density of this solution is 1.84 g/cc.

(a) 18.0 (b) 20 (c) 1.8 (d) 2.0

110. What among the following is used to produce artificial rain ?

(a) copper oxide (b) carbon monoxide (c) silver iodide (d) silver nitrate

BIOLOGY

111. Normally, in the process of Osmosis, the net flow of water molecules in or out of the cell depends upon differences in the:

(a) Concentration of water molecules inside and outside the cell.

(b) Concentration of enzymes on either side of the cell membrane.

(c) Rate of molecular motion on either side of the cell membrane.

(d) Rate of movement of insoluble molecules inside the cell.

112. Detoxification site in the liver cell is :

(a) Golgi apparatus (b) Free Ribosomes (c) RER (d) SER

113. Semi-autonomous and self replicating cell organelles is :

(a) Lysosomes (b) Mitochondria (c) Ribosomes (d) ER

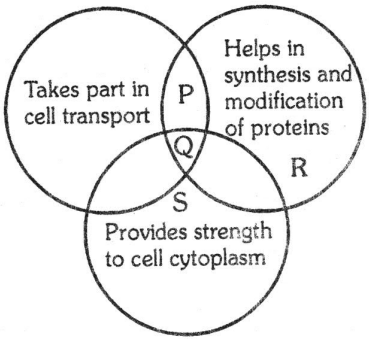
114. The plastids which make flowers and fruits conspicuous to animals for pollination and dispersal are :

(a) Chloroplast (b) Chromoplast (c) Leucoplast (d) None of these

115. Vacuolar membrane of a cell is :

(a) Plasmalemma (b) Tonoplast (c) Rhizoplast (d) Mesosome

116. Refer the given Venn diagram and select the correct option :



(a) P - Golgi apparatus; R - Microtubules (b) Q - Endoplasmic reticulum; R - Ribosomes

(c) S - Microtubules; Q - Ribosomes (d) S - Golgi apparatus; P - Lysosomes

117. Cardiac muscles are :

(a) Smooth, spindle shaped and involuntary (b) Striated, syncytial and involuntary

(c) Striated, syncytial and voluntary (d) Striated, cross connected and involuntary

118. The major constituent of vertebrate bone is :

(a) Calcium Phosphate (b) Sodium Chloride

(c) Potassium Hydroxide (d) Calcium Carbonate

119. Muscles are connected to bones by

(a) Ligaments (b) Tendons (c) Sarcolemma (d) Myofibrils

120. Which type of tissue lines body cavities and covers body surface?

(a) Nervous tissue (b) Muscle tissue (c) Epithelial tissue (d) Connective tissue

MATHEMATICS

121. Given positive integers a, b and distinct positive prime numbers c and d. If $a^4-b^4 = c.d$ then a-b=

(a) 1 (b) 0

(c) a prime number (d) a composite number

122. If a = 2 , b = 3a + 4 and c = 3b, (a, b, c are real numbers) then b – c =

(a) 30 (b) 20 (c) –20 (d) –22

123. If $2^a \times 3^b = 576$, (a and b are natural numbers) then $\frac{a}{b} =$

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

124. What is half of 4^{2014}?

(a) 2^{1007} (b) 2^{2014} (c) 4^{1007} (d) none of these

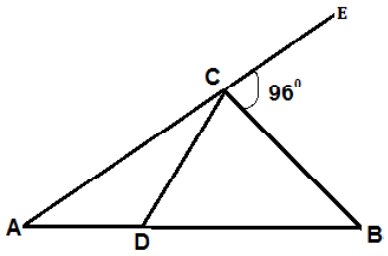
125. The sum of all coefficients of the polynomial $\left(x^{2017}-1\right)^4$ is

(a) 2017 (b) 1 (c) 0 (d) –1

126. If $a+b+c=0$ (where a,b,c are real numbers) then $\frac{a^2+b^2+c^2}{b^2-ac} =$

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

127. In the given figure, AD = CD = BC and ∠BCE = 96° then find ∠DBC.



(a) 36° (b) 32° (c) 64° (d) 72°

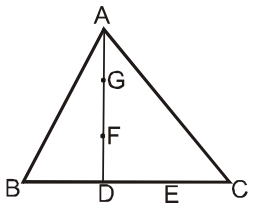
128. The value of $\sqrt{1+2008\sqrt{1+2009\sqrt{1+2010\sqrt{1+2011\times 2013}}}}$ is

(a) 2008 (b) 2009 (c) 2010 (d) 2013

129. If $x=9+4\sqrt{5}$ and $xy=1$ then $\frac{1}{x^2}+\frac{1}{y^2} =$

(a) 81 (b) 322 (c) 97 (d) 2

130. In ΔABC, D and E are points of trisection of BC. Also, F and G are points of trisection of AD. If area $\Delta ABC = 900\ m^2$, then area ΔBFG will be



(a) 400 m^2 (b) 100 m^2 (c) 200 m^2 (d) 300 m^2

131. If $\frac{x}{y}+\frac{y}{x}=-1\ (x, y \neq 0)$, then the value of $x^3 - y^3$ is

(a) 1 (b) –1 (c) 0 (d) 3

132. In a trapezium ABCD, AB || CD and $\angle D = 2\angle B$. If DC = p and AD = q then AB =

(a) p + q (b) 2p + q (c) 2p + 2q (d) 3p – 2q

133. A rhombus has one diagonal double the other. If the area of the rhombus is k then the length of its side is

(a) $\frac{5\sqrt{k}}{4}$ (b) $\frac{\sqrt{5k}}{4}$ (c) $\sqrt{\frac{5k}{4}}$ (d) $\sqrt{\frac{5k}{2}}$

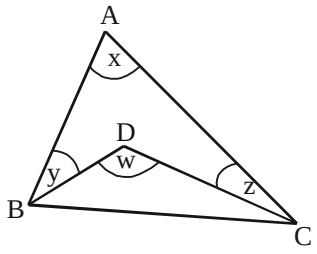
134. In triangle ABC, $\angle A = 80°$, $\angle B = 50°$, AD, BE and CF are altitudes and H is the orthocentre, then $\angle AHB$ =

(a) 125° (b) 110° (c) 140° (d) 130°

135. The points (–4, 0), (4, 0), (0, 3) are the vertices of a

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

136. D is an interior point of triangle ABC and x, y, z and w are the measures of the angles in degrees, as shown in the figure. An expression for x in terms of y, z and w is



(a) $w - y - z$ (b) $w - 2y - 2z$ (c) $2w - y - 2z$ (d) $180^0 - w - y - z$

137. It is given that $a+\frac{1}{a}=-2, a \neq 0$. What is the value of $a^2 - 3a + 2$?

(a) 0 (b) 2 (c) 6 (d) 8

138. It is given that a, b, and c are any positive real numbers such that abc = 1. What is the value of following $\frac{a}{ab+a+1}+\frac{b}{bc+b+1}+\frac{c}{ca+c+1}=?$

(a) –1 (b) 1 (c) 0 (d) None of these

139. Which among the following options is the proper match of different quadrilaterals and their respective properties?

Column I		Column II	
(A)	Rectangle	(P)	A quadrilateral having its opposite sides equal and parallel
(B)	Square	(Q)	A parallelogram with each of the angle as right angle
(C)	Parallelogram	(R)	A parallelogram having all sides equal and each of the angle is a right angle
(D)	Rhombus	(S)	A quadrilateral in which a pair of opposite sides are parallel
(E)	Trapezium	(T)	A parallelogram having all sides equal

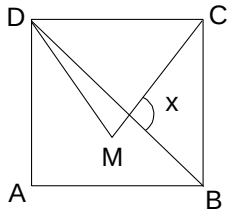
(a) A-T, B-S, C-R, D-P, E-Q (b) A-P, B-Q, C-R, D-S, E-T

(c) A-R, B-Q, C-T, D-P, E-S (d) A-Q, B-R, C-P, D-T, E-S

140. If $f(x) = ax^7 + bx^5 + cx^3 - 6$ and $f(-9) = 3$, then $f(9)$ is equal to

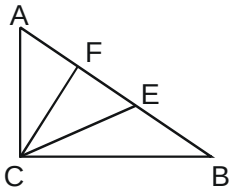
(a) – 6 (b) 0 (c) – 9 (d) – 15

141. In the figure below, ABCD is a square, MDC is an equilateral triangle. Find the value of x.



(a) 75^0 (b) 90^0 (c) 105^0 (d) 60^0

142. In a triangle ABC, $\angle BCA = 90°$, Points E and F lie on the hypotenuse AB such that AE = AC and BF = BC, then $\angle ECF$ is equal to



(a) 45^0 (b) 60^0 (c) 30^0 (d) 15^0

143. If a + b = 5 and ab = 2, then $a^4 + b^4$ =?

(a) 433 (b) 437 (c) 609 (d) 641

144. The least number which is a perfect square and is divisible by each of 16, 20 and 24 is :

(a) 3844 (b) 1024 (c) 4000 (d) 3600

145. If in a triangle ABC, perimeter = 30 cm, then the length of median AD is

(a) > 30 (b) < 15 (c) > 15 (d) 15

146. A sphere of radius r has the same volume as that of a cone with a circular base of radius r. The height of the cone is:

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

147. The fraction $\frac{2\left(\sqrt{2}+\sqrt{6}\right)}{3\left(\sqrt{2+\sqrt{3}}\right)}$ is equal to

(a) $\frac{2\sqrt{2}}{3}$ (b) $\frac{2\sqrt{3}}{3}$ (c) 1 (d) $\frac{4}{3}$

148. If $a+1=b+2=c+3=d+4=a+b+c+d+5,$ then $a+b+c+d=$

(a) –5 (b) $-\frac{10}{3}$ (c) $-\frac{7}{3}$ (d) $\frac{5}{8}$

149. The value of $\frac{817\times817\times817-98\times98\times98}{817\times817+98\times98+817\times98}$ is

(a) 715 (b) 719 (c) 1329 (d) 915

150. The heights of two solid cylinder are in ratio 3 : 2 and radii in 2 : 1 respectively. Find the ratio of their volume

(a) 3 : 2 (b) 4 : 2 (c) 3 : 1 (d) 6 : 1