



**VISAKHAPATNAM CENTRE**

**NTSE-NOVEMBER, 2019 (STAGE – 1 – AP)**  
**SCHOLASTIC APTITUDE TEST**  
**QUESTION PAPER CODE: 209213**

**Time : 2 Hrs**

**Max.marks: 100**

**INSTRUCTIONS**

Read the following instructions carefully before you answer the questions. Answers are to be SHADED on a SEPARATE OMR Answer Sheet given, with HB Pencil. Read the Instructions printed on the OMR Sheet carefully before answering the question.

1. Please write your Center Code Number and Roll Number very clearly (only one digit in one block) on the OMR Sheet as given in your admission card. Please see that no block is left unfilled and even zeros appearing in the Center Code Number are correctly transferred to the appropriate blocks on the OMR Sheet as shown in the example given in the OMR Sheet. For all the subsequent purpose your Center Code Number and Roll Number shall remain the same as given on the Admission Card.
2. Paper-II (Scholastic Aptitude test) consists of 100 questions (Q.Nos 1 to 100)
3. All questions carry one mark each.
4. Since all questions are compulsory do not try to read through the whole question paper before beginning to answer it.
5. Begin with the first question and keep trying one question after another till you finish all the questions
6. If you do not know the answer to any question, do not spend much time on it and pass on to next one. If time permits, you can come back to the questions which you have left in the first instance and try them again.
7. Since the time allotted to the question paper is very limited, you should make the best use of it by not spending too much time on any question.
8. A black page is provided for rough work at the end of question paper.
9. REMEMBER YOU HAVE TO SHADE ANSWERS ON A SEPARATE OMR SHEET PROVIDED.
10. Answer to each question is to be indicated by SHADING the circle having the number of the correct alternative in OMR Sheet from among the ones given for the corresponding question in the booklet.
11. Now turn to the next page and start answering the questions.
12. The OMR answer sheet consists of two copies, the ORIGINAL COPY and the CANDIDATE'S COPY. Do not separate or displace them. Do not darken the bubbles in two copies of OMR answer sheets separately. After the examination, you should hand over the OMR Sheet to the Invigilator of the room and can take away the candidate's copy of OMR answer sheet with them.
13. The candidate need not return this Question Paper booklet and can take it after completion of the examination. No candidate should leave the examination hall before the end of the examination.

**PAPER - I**  
**SCHOLASTIC APTITUDE TEST**  
**(Q.Nos. 1 to 100)**  
**Max. marks : 100**

Note:

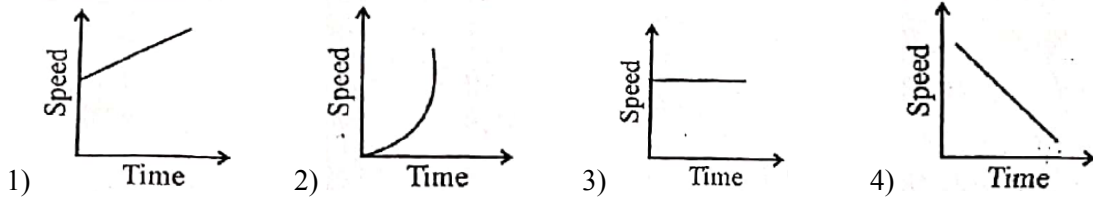
- (i) Subjects, Total questions of each subject and marks allotted:
- |    |                   |              |          |
|----|-------------------|--------------|----------|
| 1) | Physics           | 13 questions | 13 marks |
| 2) | Chemistry         | 13 questions | 13 marks |
| 3) | Biology           | 14 questions | 14 marks |
| 4) | Mathematics       | 20 questions | 20 marks |
| 5) | History           | 12 questions | 12 marks |
| 6) | Geography         | 12 questions | 12 marks |
| 7) | Political Science | 08 questions | 08 marks |
| 8) | Economics         | 08 questions | 08 marks |
- (ii) SHADE the correct alternatives in the OMR Answer Sheet provided, from amongst the ones given against the corresponding question in the Question Booklet. For shading the circles, use HB Pencil.



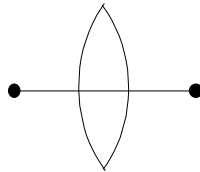


**PHYSICS**

13. Which of the following graph represents non-uniform acceleration?



14. A convex lens of focal length 20cm is cut into two halves. Each of which is placed 0.5mm and a point object placed at a distance of 30cm from the lens as shown. Then the image is at



- 1) 70 cm                      2) 30 cm                      3) 50 cm                      4) 60 cm

15. Match the following

Name of the planet	Gravitation $m/s^2$
A. Earth	1. 25.95
B. Jupiter	2. 3.7
C. Saturn	3. 9.8
D. Mars	4. 11.8

- 1) A – 4, B – 2, C – 3, D – 1                      2) A – 3, B – 2, C – 1, D – 4  
 3) A – 3, B – 1, C – 4, D – 2                      4) A – 2, B – 1, C – 3, D – 4

16. A point object is placed at a distance of 10cm and its real image is formed at a distance of 20cm from a concave mirror. When the object is moved by 0.1cm towards the mirror, then the image will be moved by about

- 1) 0.8 cm away from the mirror                      2) 0.4 cm away from the mirror  
 3) 0.8 cm towards the mirror                      4) 0.4 cm towards the mirror

17. A person fired a gun standing at a distance of 55m from a wall. If the speed of sound is 330m/s, the time for an echo heard is

- 1) 0.6s                      2) 0.3s                      3) 0.5s                      4) 0.4s

18. Bulb ‘P’ marked as 100W, 220V and bulb Q marked as 60W, 110V. The resistance ratio of P and Q is

- 1) 5 : 12                      2) 5 : 7                      3) 12 : 5                      4) 12 : 7

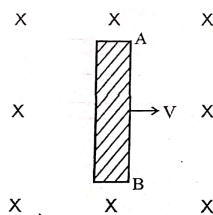
19. Match the following

List - P	List - Q
A. 1 Joule	1. 4.186 J
B. 1 WH	2. $3.6 \times 10^6$ J
C. 1 kWh	3. $10^7$ ergs
D. 1 calorie	4. 3.6 kJ

The correct match is

- 1) A – 3, B – 4, C – 2, D – 1                      2) A – 4, B – 3, C – 1, D – 2  
 3) A – 1, B – 3, C – 4, D – 2                      4) A – 2, B – 1, C – 4, D – 3

20.

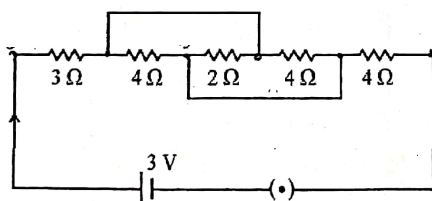


As per the above figure

- 1) The end 'B' of the rod becomes charged
  - 2) Electric current flows along the rod from A to B
  - 3) The end 'A' of the rod becomes positively charged
  - 4) The rod AB is uniformly charged
21. Assertion (A) : Work done by gravitational force in a moving body path is independent.  
Reason (R) : Gravitational force is non-conservative force.

- 1) Both (A) and (R) are true and (R) is correct explanation to (A)
- 2) Both (A) and (R) are true and (R) is not correct explanation to (A)
- 3) (A) is true, but (R) is false
- 4) (A) is false, but (R) is true

22.



Find the current flowing through the above circuit.

- 1) 0.375 A
  - 2) 0.374 A
  - 3) 3.74 A
  - 4) 3.75 A
23. The radius of curvature of a plano-convex lens which has 2 refractive index is 20cm. By applying silver bromide on its surface to change it as a concave mirror, what is the focal length of the formed mirror?
- 1) 20cm
  - 2) 10cm
  - 3) 5cm
  - 4) 40cm
24. Assertion (A) : The velocity of a particle may vary even when it's speed is constant  
Reason (R) : The particle is moving in circular path.
- 1) Both (A) and (R) are true and (R) is correct explanation to (A)
  - 2) Both (A) and (R) are true and (R) is not correct explanation to (A)
  - 3) (A) is true, but (R) is false
  - 4) (A) is false, but (R) is true
25. Identify the following colours in the ascending orders of their frequencies.
- 1) Red, blue, yellow, green
  - 2) Blue, green, yellow, red
  - 3) Red, green, yellow, blue
  - 4) Red, yellow, green, blue

## ECONOMICS

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26. Which of the following is not a feature of liberalization?
- Business are allowed to make decisions freely about what they wish to import or export.
  - Government removes restrictions from foreign trade
  - MNCs are allowed to work in the country
  - It establishes rules regarding international trade
- 1) Only c, d                      2) Only b, c                      3) All of these                      4) Only a, b, d
27. In the rural areas, the unorganized sector mostly comprises of
- Landless agricultural labourer
  - Garment makers
  - Street vendors
  - Sharecroppers and artisans
- 1) (i) and (iv)                      2) (i) and (ii)                      3) (iii) and (iv)                      4) (ii) and (iii)
28. Choose the wrong pair from given below.
- Per capita income US \$ 12,600 and above rich countries
  - per capita income US \$ 1,035 and above low countries
  - Human development index – UNDP
  - Per capita income – world bank
29. Terms of credit does not include
- Interest rate                      2) Collateral                      3) Cheque                      4) Mode of repayment
30. Which of the following are correct regarding WTO?
- Its main aim is to liberalise international trade
  - It was started at the initiative of the developed countries.
  - The rules of WTO are framed to favour the developing countries
  - It establishes rules regarding international trade
- 1) All of these                      2) Only (ii) and (iii)                      3) Only (iii) and (iv)                      4) Only (i), (ii) and (iv)
31. For calculating body mass index (BMI), weight of the person is divided by the
- square of the sum of height and weight                      2) square of the weight
  - square root of the height                      4) square of the height
32. Which of the following methods can be used by the government for a fair globalization?
- impose trade barriers                      (ii) negotiate at the WTO for fairer rules
  - align with other developing countries
  - close its market for foreign trade
- 1) only (i) and (ii)                      2) only (ii) and (iv)                      3) All of these                      4) Only (i), (ii) and (iii)
33. Which of the following is not correct relating to service sector?
- 25% of people are engaged in service sector
  - All the people who employed in service sector are earning high income
  - Service sector in India employs many different kinds of people.
  - All service sector activities are not growing equally well

## POLITICAL SCIENCE

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34. What type of information is not accessible to the citizen as per RTI?

- 1) The particulars of its organisation, functions and duties
- 2) The powers and duties of its officers and employees
- 3) Endanger the life or physical safety of a person
- 4) The manner of executions of subsidy programmes, including amounts allocated.

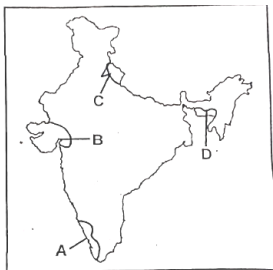
35. Observe the given 'Logo' and answer the question.



This 'Logo' represents to

- 1) United Nations Organisation
  - 2) United Nations Human Rights Commission
  - 3) United Nation Educational, scientific and cultural organization
  - 4) United Nations Children's Fund
36. Which of the following statement is correct regarding with "Coliation Government"?
- 1) Power shared among governments at different levels
  - 2) Power shared among different organization of government
  - 3) Power shared by two or more political parties
  - 4) Power shared by different social groups

37. Observe the map below:



Identify the pointed states with their corresponding social and environment movements and select the correct option using the codes given below.

- 1) A – silent valley movement, B – Narmada Bachao Andolan, C – chipko movement, D – Meira paibi movement



2) A – Narmada Bachao Andolan, B – silent valley movement, C – chipko movement, D – Meira paibi movement

3) A – chipko movement, B – Narmada Bachao Andolan, C – silent valley movement, D – Meira Paibi movement.

4) A – silent valley movement, B – Chipko movement, C – Narmada Bachao Andolan, D – Meira Paibi movement.

38. Match column I with column II and select the correct answer using the codes given below the columns.

Column – I Political party	Column – II State
A. SAD	1. Uttar Pradesh
B. DMK	2. Assam
C. AGP	3. Tamil Nadu
D. BLD	4. Punjab

1) A – 1, B – 2, C – 3, D – 4

2) A – 4, B – 2, C – 3, D – 1

3) A – 4, B – 3, C – 2, D – 1

4) A – 1, B – 3, C – 2, D – 4

39. With reference to democracy, consider the following statements:

A) In a democracy, only leaders elected by people should rule the country

B) People have the freedom to express views, freedom to organize and freedom to protests.

Which of the statement(s) given above is/are correct?

1) B only

2) Neither A nor B

3) A only

4) Both A & B

40. With reference to the fundamental rights, consider the following statements:

A) Indian constitution guarantees fundamental rights to its citizen

B) Fundamental rights are absolute and never suspended

Which of the statement/s given above is/are correct?

1) both A and B

2) A only

3) B only

4) Neither A nor B

41. Which of the following statement is incorrect regarding with first general elections in India?

1) Only 10% of the population could vote in that elections

2) Separate ballot boxes for each candidate

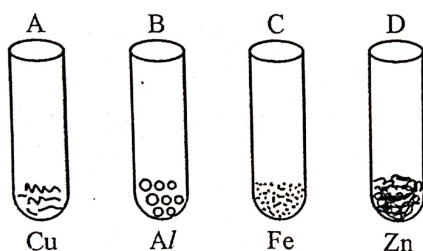
3) Massive campaign to encourage the voters

4) Symbols were introduced

## CHEMISTRY

42. Find the correct increasing order of ionic radius among  $Al^{3+}$ ,  $Mg^{2+}$ ,  $O^{2-}$ ,  $F^{-}$
- 1)  $Al^{3+} < Mg^{2+} < O^{2-} < F^{-}$                       2)  $F^{-} < Mg^{2+} < Al^{3+} < O^{2-}$   
 3)  $Al^{3+} < Mg^{2+} < F^{-} < O^{2-}$                       4)  $Mg^{2+} < F^{-} < O^{2-} < Al^{3+}$
43. The elements A, B, C and D have atomic numbers 9, 10, 11 and 12 respectively. The correct order of ionization energy is
- 1)  $D > C > B > A$       2)  $A > B > C > D$       3)  $B > A > C > D$       4)  $B > A > D > C$
44. Find the composition of stainless steel
- 1) Fe, Cr, Ni                      2) Fe, C, Ni                      3) Fe, Ni, Cu                      4) Fe, Cr, Cu

45.



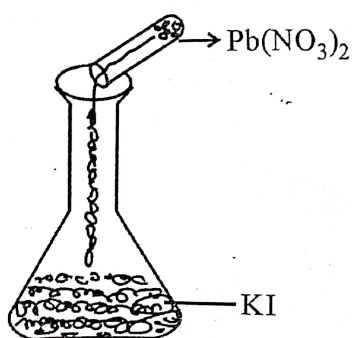
If we added  $FeSO_4$  to above four test tubes, in which test tube we observe black residue?

- 1) 'A' and 'B'                      2) 'B' and 'D'                      3) 'B' and 'C'                      4) 'A' and 'C'
46. Match the following

List – P	List – Q
A. Ethane	1. 2 sp carbons
B. Ethylene	2. 6 sp <sup>2</sup> carbons
C. Acetylene	3. 2 sp <sup>3</sup> carbons
D. Benzene	4. 2 sp <sup>2</sup> carbons

- 1) A – 3, B – 2, C – 4, D – 1                      2) A – 3, B – 4, C – 1, D – 2  
 3) A – 4, B – 3, C – 1, D – 2                      4) A – 2, B – 3, C – 1, D – 4
47. Set of elements with the following atomic numbers belongs to the same group
- 1) 24, 47, 42, 55                      2) 11, 19, 27, 5                      3) 12, 20, 4, 38                      4) 9, 16, 35, 3
48. Electronegativity of the following elements increase in the order
- 1) C, N, Si, P                      2) N, Si, C, P                      3) P, Si, N, C                      4) Si, P, C, N

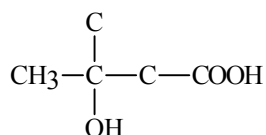
49.



From the above experimental set-up, what precipitate we obtain and what is the colour of obtained precipitate?

- 1) Lead iodide – yellow  
 2) Potassium nitrate – yellow  
 3) Lead iodide – red  
 4) Potassium nitrate – red

50. IUPAC Name of the



- 1) 2-Hydroxy-2 Methyl – Butane  
 2) 3-Ethyl - Methyl – Propane  
 3) 3-Hydroxy – 3 Methyl – Butanoic acid  
 4) 3-3 diethyl Butane

51. An atom ‘A’ belongs to III A group and another atom “B” belongs to VI A group. The formula of the compound formed is

- 1)  $A_3B_6$                       2)  $A_2B$                       3)  $A_2B_3$                       4)  $A_3B_2$

52. The allowable combinations of quantum numbers for each of the electron in 4s, 3p, 5d orbitals respectively

- 1)  $n = 4, l = 0, m_l = +1$ ;  $n = 3, l = 2, m_l = 1$ ;  $n = 5, l = 3, m_l = 0$   
 2)  $n = 4, l = 0, m_l = 0$ ;  $n = 3, l = 0, m_l = 0$ ;  $n = 5, l = 1, m_l = 0$   
 3)  $n = 4, l = 0, m_l = 0$ ;  $n = 3, l = 2, m_l = -1$ ;  $n = 5, l = 3, m_l = -2$   
 4)  $n = 4, l = 0, m_l = 0$ ;  $n = 3, l = 1, m_l = 0$ ;  $n = 5, l = 2, m_l = -1$

53. **Assertion (A):** Isotopes are electrically neutral.

**Reason (R):** Isotopes are species with same mass number but different atomic number.

- 1) Both (A) and (R) are true and (R) is the correct explanation to (A).  
 2) Both (A) and (R) are true, but (R) is not the correct explanation to (A).  
 3) (A) is false but (R) is true.                      4) (A) is true, but (R) is false.

54. Find the correct matching

Bond	Band Energy kJ/mol
A. H-H	1. 193
B. Br-Br	2. 366
C. H-Cl	3. 432
D. H-Br	4. 436

- 1) A-3, B-4, C-2, D-1                      2) A-4, B-1, C-3, D-2  
 3) A-4, B-3, C-1, D-2                      4) A-2, B-3, C-4, D-1

## GEOGRAPHY

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55. Among the following statements, which is not true?
- 1) Himachal range is mainly composed of highly compressed rocks.
  - 2) The Pirpanjal and Mahabharata ranges form the important ranges of the Himachal.
  - 3) The average elevation of Himachal range is about 6,100 mts. above MSL.
  - 4) The portion of range found south of the Greater Himalayas is known as 'Lesser Himalayas'.
56. Statement I: Density of population in North-East states is less due to heavy rainfall.  
Statement II: Density of population in Kerala is high due to flat surface fertile soil and abundant rainfall.
- 1) Both I, II are true
  - 2) Both I, II are false
  - 3) I is true, but II is false
  - 4) I is false, but II is true
57. The ocean beds are rich in
- 1) Gold
  - 2) Iron
  - 3) Copper
  - 4) Manganese
58. Which of the following lakes is a fresh water lake?
- 1) Pulicat
  - 2) Chilka
  - 3) Dal
  - 4) Sambhar
59. Which of the following is the correct statement?
- I) The peninsular plateau is one of the most ancient land blocks on the earth's surface.
  - II) One of the remarkable features of the peninsular plateau is black soils formed due to volcanic activity.
- 1) Only I is true
  - 2) Only II is correct
  - 3) I and II are correct
  - 4) I and II are incorrect
60. Population change in a place is
- 1) (No. of births + No. of in migrants) + (No. of births + No. of out migrants)
  - 2) (No. of births - No. of in migrants) - (No. of births - No. of out migrants)
  - 3) (No. of births + No. of in migrants) - (No. of deaths + No. of out migrants)
  - 4) (No. of births - No. of in migrants) - (No. of deaths + No. of out migrants)

61. Which of the following statements is not true regarding India's Climate?
- 1) The climate of India is described as the monsoon type
  - 2) The climate of India is strongly influenced by trade winds
  - 3) The North-East monsoons are responsible for most of the rain fall in India.
  - 4) India's climate has characteristics of tropical as well as subtropical climate.

62. Match the following:

Column I	Column II
A. Loo	1. Coromandal Coast
B. Mango Showers	2. Andhra Pradesh
C. Winter rainfall	3. Dry and hot winds
D. Upper air currents	4. Jet Streams

Which of the correct set?

- 1) A-2, B-3, C-1, D-4
  - 2) A-3, B-2, C-1, D-4
  - 3) A-4, B-3, C-2, D-1
  - 4) A-1, B-2, C-3, D-4
63. Which of the following is not true with reference to the climate condition required for the cultivation of rice?
- 1) It requires high temperature i.e., above 25<sup>0</sup> C
  - 2) It requires annual rainfall above 100 Cm
  - 3) It requires high humidity
  - 4) It requires 210 frost free days
64. Kudremukh is an important Iron ore mine of
- 1) Andhra Pradesh
  - 2) Kerala
  - 3) Madhya Pradesh
  - 4) Karnataka
65. Which is correct regarding Rural – Urban migration?
- a) Migration mainly due to insufficient employment opportunities in rural areas.
  - b) Migration does not necessarily involve movement of all members of the family
  - c) They have greater exposure to new ideas in cities and try to challenge older notions in village
- 1) b, c
  - 2) a, b
  - 3) a, b, c
  - 4) None of these
66. Which of the following is not correct regarding 'Jet Streams'?
- 1) These causes rain from clouds
  - 2) Jet streams develops at about 35<sup>0</sup> N
  - 3) These causes the neighboring atmosphere cool
  - 4) These are fast flowing air currents in a narrow belt in the upper atmosphere

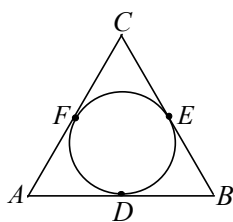


## MATHEMATICS

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81. If the mean of first 'n' natural numbers is  $\frac{6n}{11}$  then n =  
 1) 9                                      2) 12                                      3) 10                                      4) 11
82. If  $\cos \theta = \frac{a}{b}$  then  $\operatorname{cosec} \theta + \cot \theta$  in terms of a and b is  
 1)  $\sqrt{\frac{a+b}{a-b}}$                               2)  $\sqrt{\frac{b-a}{b+a}}$                               3)  $\sqrt{\frac{a-b}{a+b}}$                               4)  $\sqrt{\frac{b+a}{b-a}}$
83. If -2 is a root of the quadratic equation  $x^2 - px + 6 = 0$  and  $x^2 + px - k = 0$  has equal roots, then the value of k is  
 1) 10                                      2) 14                                      3) 6                                      4) 18
84. The sum of a number and its reciprocal is  $2\frac{1}{6}$  then the number is  
 1)  $\frac{5}{6}$  or  $\frac{6}{5}$                               2)  $\frac{4}{5}$  or  $\frac{5}{4}$                               3)  $\frac{2}{3}$  or  $\frac{3}{2}$                               4)  $\frac{3}{4}$  or  $\frac{4}{3}$
85. A copper sphere of radius 3 cm is melted and recast into a right circular cone of height 3 cm. Then the radius of the base of the cone is  
 1) 6 cm                                      2) 4 cm                                      3) 5 cm                                      4) 3 cm
86. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $P(x) = x^2 + 3x + k$  such that  $\alpha - \beta = 5$ , then the value of k is  
 1) -4                                      2) 5                                      3) -3                                      4) 2
87. If  $\frac{x-y}{xy} = 5$  and  $\frac{x+y}{xy} = 7$ , then the value of 'x' is  
 1) 1                                      2)  $\frac{1}{6}$                                       3)  $\frac{1}{2}$                                       4)  $\frac{1}{3}$
88. If  $\alpha$  and  $\beta$  are zeros of the quadratic polynomial  $P(x) = x^2 + qx - p$ , then the value of  $\frac{1}{\alpha} + \frac{1}{\beta}$  is  
 1)  $\frac{p}{q}$                                       2)  $\frac{q}{p}$                                       3)  $\frac{-p}{q}$                                       4)  $\frac{-q}{p}$
89. The solution of the line equation  $\cos 30^\circ x + \sin 30^\circ y = 3$  is  
 A) (2, 3)                                      B) (0, 6)                                      C)  $(2\sqrt{3}, 0)$                                       D)  $(0, 2\sqrt{3})$   
 1) B and C                                      2) A and D                                      3) C and D                                      4) A

90. In the adjacent figure if  $AB = 10$  cm,  $BC = 12$  cm and  $AC = 14$  cm, then  $AD =$



- 1) 8 cm                                      2) 7 cm                                      3) 5 cm                                      4) 6 cm

91. If two positive integers ‘a’ and ‘b’ are expressible in the form of  $a = p^3q^2$  and  $b = p^2q^4$ , p and q being prime numbers, then LCM (a,b) is

- 1)  $p^3q^3$                                       2)  $p^2q^4$                                       3)  $p^3q^4$                                       4)  $p^2q^3$

92. 20 cards numbered 1,2,3,.....20 are put in a box and mixed thoroughly. One person draws a card from the box, the probability that the number on the card is divisible by 2 and 3 both is

- 1)  $\frac{1}{10}$                                       2)  $\frac{3}{20}$                                       3)  $\frac{1}{5}$                                       4)  $\frac{3}{10}$

93. The 10<sup>th</sup> term from the end of the A.P. 5, 12, 19, .....173 is

- 1) 117                                      2) 103                                      3) 110                                      4) 96

94. If the points (a, 2a), (3a, 3a) and (3, 1) are collinear then the value of ‘a’ is

- 1)  $\frac{-2}{3}$                                       2)  $\frac{-1}{3}$                                       3)  $\frac{-1}{2}$                                       4)  $\frac{2}{3}$

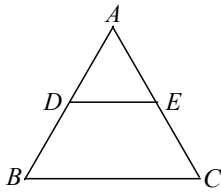
95. Match the item in Column – I with Column – II

Column - I	Column – II
A. Slope of x-axis	1. $\sec 0^\circ$
B. Slope of y-axis	2. $\sin 0^\circ$
C. Distance between the points ( $\sin 55^\circ, 0$ ) and (0, $\sin 35^\circ$ )	3. $\cot 0^\circ$

- 1) A-2, B-3, C-1                                      2) A-2, B-1, C-3                                      3) A-3, B-1, C-2                                      4) A-1, B-2, C-3



96. From the adjacent figure  $\triangle ABC$ ,  $DE \parallel BC$  and  $AD = \frac{1}{2}BD$ . If  $BC = 6$  cm then  $DE$  is



- 1) 1.5 cm                      2) 4 cm                      3) 3 cm                      4) 2 cm
97. If  $\triangle ABC$  is an equilateral triangle such that  $AD \perp BC$ , then  $AD^2 =$
- A)  $\frac{3a^2}{4}$                       B)  $\frac{3a^2}{2}$                       C)  $\frac{3}{4}BC^2$                       D)  $\frac{\sqrt{3}}{2}a$
- 1) A and C                      2) D                      3) A                      4) B and C
98. Metallic spheres of radii 15 cm, 20 cm and 25 cm respectively are melted to form a single solid sphere. Then the radius of the resulting sphere is
- 1) 25 cm                      2) 20 cm                      3) 30 cm                      4) cm
99. Which of the following statement is not correct?
- 1) The line  $\operatorname{cosec} 60^\circ x + \cos 45^\circ y = 4$  passing through the point  $(\tan 60^\circ, \sec 45^\circ)$ .
- 2) If the pair of linear equations  $4x + 5y = 9$  and  $8x + ky = 18$  has infinitely many solutions, then  $k=10$
- 3) If  $\alpha, \beta$  are the zeroes of the quadratic polynomial  $x^2 - 2x + 1$ , then  $\alpha^3 + \beta^3 = 2$
- 4) If  $\tan \theta + \cot \theta = 5$ , then  $\tan^2 \theta + \cot^2 \theta = 23$
100. If AP is a tangent to the circle with centre 'O' such that  $OP = 4$  cm and  $\angle OPA = 60^\circ$ , then the radius of the circle is
- 1)  $2\sqrt{2}cm$                       2)  $2\sqrt{3}cm$                       3) 2 cm                      4) 3 cm