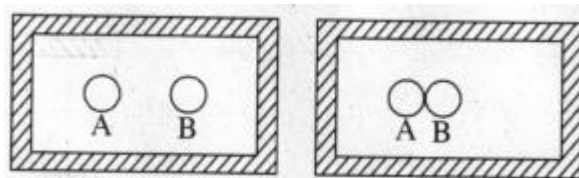


MAHARASHTRA NATIONAL TALENT SEARCH EXAMINATION 2019- 20 SCHOLASTIC APTITUDE TEST

1. A tennis ball is thrown up and reaches a certain height and comes down in $8s$. If values of acceleration due to gravity ($g = 10ms^{-2}$), then height reached by tennis ball and velocity with which it strikes the ground respectively is ____ and ____
 (1) 640m, 160m/s (2) 320m, 120m/s
 (3) 160m, 80m/s (4) 80m, 40m/s
2. 200g steam at $100^{\circ}C$ is introduced on 800g ice at $0^{\circ}C$. Find the final temperature of the mixture
 (1) 20° (2) 30°
 (3) 40° (4) 50°
3. For a colour blind person choose the incorrect statement from the following:
 (1) rod cells are present on retina
 (2) cone cells are present on retina
 (3) Eyesight of person is normal
 (4) Proper information about intensity of light of object is given to brain
4. A sound signal is simultaneously sent in air and water from a bat on a river. The echo of sound striked by river bed is heard in $4s$, while echo striked by aeroplane is heard in $8s$. Find the distance between aeroplane and river bed [velocity of sound in air = $350m/s$, velocity of sound in water = $1500m/s$.]
 (1) 4.4km (2) 6.7km
 (3) 8.8km (4) 13.4km
5. Unit of gravitational potential energy ____
 (1) J/s (2) Js
 (3) Nm (4) N/m
6. A ray of light is incident on the surface of transparent medium at an angle of 45° and is refracted in the medium at an angle of 30° . What will be the velocity of light in the transparent medium?
 (1) $1.96 \times 10^8 m/s$ (2) $2.12 \times 10^8 m/s$
 (3) $2.65 \times 10^8 m/s$ (4) $1.25 \times 10^8 m/s$
7. Match the columns, Choose correct alternative from given options:

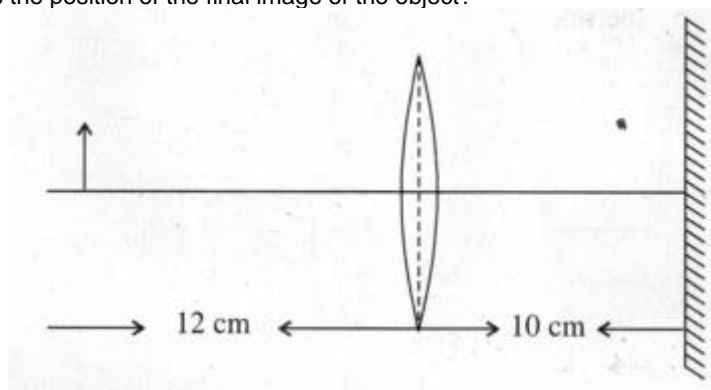
I	II	III	IV
Satellite Orbits	Height above earth surface (in km)	Period of revolution (hours)	Use
A. High earth orbit B. Medium earth orbit C. Low earth orbit	a. 180 – 2000 b. ≥ 35780 c. 2000 – 35780	I. 2 – 24 II. < 1 III. 24	(i) meteorology (ii) Hubble telescope (iii) G.P.S

- (1) A-a-I-(i), B-c-II-(ii), C-b-I-(iii) (2) A-a-III-(i), B-c-I-(iii), C-a-II-(ii)
- (3) A-b-II-(ii), B-a-III-(i), C-b-III-(iii) (4) A-c-III-(iii), B-b-II-(i), C-a-II-(i)
8. An electric iron uses a power of $1320W$ when set to higher temperature. If set to lower temperature on third of higher temperature current is used. If iron is connected to a potential of $220V$, then power used to lower temperature is _____
 (1) 220W (2) 440W
 (3) 660W (4) 880W
9. 250kg of water per minute is to be drawn from a well 150m deep. An electric pump of ____ can be used. ($g = 10ms^{-2}$)
 (1) 6 horse power (2) 7 horse power
 (3) 8 horse power (4) 9 horse power
10. Two copper metal spheres [A & B] of same mass and surface area at temperature at $T_A = 80^{\circ}C$ and $T_B = 50^{\circ}C$ are kept separated in a heat resistant box. Due to _____ temperatures of A and B are changing and reaching a constant temperature of _____ C. Heat transfer takes place by _____, but if both spheres are in contact heat transfer is bt _____



- (1) Principle of heat, 70° , convection radiation
- (2) Principle of heat exchange, 68° radiation conduction
- (3) Principle of heat exchange, 65° radiation, conduction
- (4) Principle of heat exchange, 65° conduction, convection

11. An object, a convex lens of focal length 20 cm and a plane mirror are arranged as shown in figure. How far behind the mirror is the position of the final image of the object?



- (1) 40 cm
- (2) 30 cm
- (3) 20 cm
- (4) 10 cm

12. Choose the correct statement

- (1) Alternating current is oscillatory
- (2) Electric power is transmitted over long distances using alternating current
- (3) Frequency of alternating current in India is 50 Hz
- (4) Alternating current can be used for electrolysis of copper chloride

13. Three lenses have a combined power of 2.7 D. If the powers of two lenses are 2.5 D and 1.7 D respectively, find the focal length of the third lens

- (1) -66.66 cm
- (2) -6.666 cm
- (3) -66.66 m
- (4) -6.666 m

14. The groups _____ constitute the p-block

- (1) 3 to 12
- (2) 1 to 2
- (3) 13 to 18
- (4) 1 to 7

15. _____ metal generally occurs in free state

- (1) Sodium
- (2) Platinum
- (3) Magnesium
- (4) Potassium

16. In cold region during winter _____ freezes at room temperature itself and looks like ice.

- (1) Palmitic acid
- (2) Linoleic acid
- (3) Oleic acid
- (4) Ethanoic acid

17. All man made elements are placed after an element having atomic number 92 named _____

- (1) Beryllium
- (2) Cadmium
- (3) Uranium
- (4) Lithium

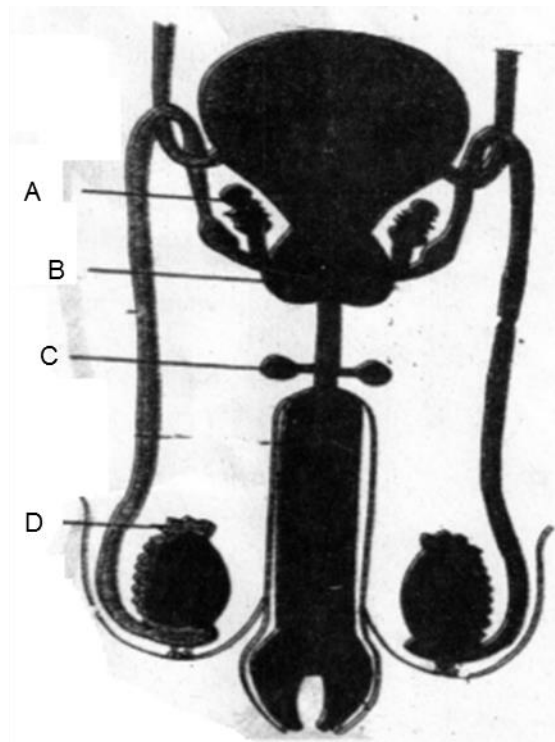
18. The molecular formula of Ethyne is _____

- (1) C_2H_5
- (2) C_2H_4
- (3) C_2H_2
- (4) C_2H_6

19. Melting point of Tungsten metal is _____

- (1) 3422
- (2) 3322
- (3) 3420
- (4) 3430

20. Weak base is ____
 (1) NaOH (2) KOH
 (3) NH_4OH (4) Na_2O
21. Molecular mass of Benzene is ____
 (1) 72 (2) 78
 (3) 79 (4) 77
22. The monomer styrene has structural formula ____
 (1) $\text{C}_6\text{H}_5 - \text{CH} = \text{CH}_2$ (2) $\text{C}_6\text{H}_5 - \text{CH}_2 = \text{CH}_2$
 (3) $\text{C}_5\text{H}_6 - \text{CH} = \text{CH}_2$ (4) $\text{C}_5\text{H}_2 - \text{CH}_2 = \text{CH}_2$
23. The percentage of carbon in Lignite is _____ %
 (1) 70 to 90 (2) 60 to 80
 (3) 60 to 90 (4) 60 to 70
24. _____ is used in the blood test for diagnosing anaemia.
 (1) Borax (2) Baking soda
 (3) Blue vitriol (4) Bleaching powder
25. Aquaregia is prepared by mixing conc. HCl and conc. HNO_3 in the ratio ____
 (1) 1 : 3 (2) 3 : 2
 (3) 1 : 4 (4) 3 : 1
26. Adding zinc to blue coloured copper sulphate solution, a _____ solution of zinc sulphate is formed
 (1) Reddish (2) Colourless
 (3) Greenish (4) Purple
27. In living organisms sometimes any nucleotide of the gene changes its position that causes a minor change which is nothing but the ____
 (1) Transcription (2) Mutation
 (3) Evolution (4) Translocation
28. In mitosis in ____ step centromeres split and thereby sister chromatids of each chromosome separate and they are pulled apart in opposite directions.
 (1) Prophase (2) metaphase
 (3) Anaphase (4) telophase
29. Identify Cowper's gland from the following figure:



- | | |
|-------|-------|
| (1) A | (2) B |
| (3) C | (4) D |

30. Identify odd term related with reproduction in living organisms.
- | | |
|----------------------|-------------------|
| (1) Zygote formation | (2) Fragmentation |
| (3) Regeneration | (4) Budding |
31. Which of the following species are rare species?
- | | |
|--|----------------------------|
| (1) lion, tailed monkey, lesser florican | (2) strip tiger, geer lion |
| (3) red panda, musk deer | (4) shekhru squirrel |
32. Which is the animal in phylum platyhelminthes?
- | | |
|--|------------------------|
| (1) Intestinal worm (Ascaris) | (2) Planaria |
| (3) Elephant's ;eg worm (Filaria worm) | (4) Eye worm (Loa loa) |
33. Identify animal from phylum Mollusca which can be perform three types of locomotions like swimming, creeping and walking.
- | | |
|-------------|-------------|
| (1) Bivalve | (2) Snail |
| (3) Pearl | (4) Octopus |
34. Which microbe is used in preparing beverage cider by fermenting juice in apple?
- | | |
|------------------------------|---------------|
| (1) Saccharmoyces Cerevisiae | (2) Candida |
| (3) Lactobacillus brevis | (4) Hansenula |
35. To prepare chocolates and toffees from sugar molasses and salt which microbe is used?
- | | |
|------------------------|-------------------------------|
| (1) Aspergillus fereus | (2) Brevibacterium |
| (3) Aspergillus Nigar | (4) Lactobacillus delbrueckii |
36. In which variety of rice a gene synthesizing vitamin A (Beta Carotene) has been introduced?
- | | |
|-----------|-----------------|
| (1) Jaya | (2) Golden Rice |
| (3) Ratna | (4) Indrayani |
37. Which state in the country is at forefront in controlling the cyber crimes and has been proved to be a first to start a separate cybercrime unit?
- | | |
|--------------------|-----------------|
| (1) Gujarat | (2) Karnataka |
| (3) Madhya Pradesh | (4) Maharashtra |
38. Choose the correct order of main aspects of disaster management cycle.
- | |
|--|
| (1) Impact of disaster → Response → Resurgence → Preparation → Redemption → Preparedness |
| (2) Preparation → redemption → preparedness → impact of disaster → Response → resurgence |
| (3) Resurgence → response → Impact of disaster → Preparedness → Redemption → Preparation |
| (4) Redemption → Response → Impact of disaster → Preparation → Resurgence → Preparedness |

39. Abnormalities in sex chromosomes cause disorders Turner Syndrome (Turner – Monosomy) means
 (1) $44+X$ (2) $44+XX$
 (3) $44+XY$ (4) $44+XXY$
40. Identify the bacteria which spoil cooked food?
 (1) Rizobium (2) Yeast
 (3) Clostridium (4) Lactobacillus
41. Who write the book, 'Discourse on Method'?
 (1) Rene Descartes (2) Voltaire
 (3) Karl Marx (4) Michael Foucault
42. Identify the wrong pair from the pairs given below:
 (1) Kootiyattam – Sanskrit theatre, Kerala
 (2) Ramman – Religious festival and ritual of the Garwal
 (3) Ramlila – Traditional performance of the Ramayan in Uttar Pradesh
 (4) Kalbelia – Dance form in West Bengal
43. Where we can see the Murals of Maratha style in the old wadas in Maharashtra?
 (1) Pune (2) Satara
 (3) Solapur (4) Kolhapur
44. Which dance form has been shown in the picture printed below:



- (1) Kathak (2) Kathakali
 (3) Mohiniattam (4) Lavni
45. Identify the name of the gentleman, who started The First English Newspaper of India.
 (1) Balshashtri Jambhekar (2) Bhau Mahajan
 (3) James Augustus Hickey (4) Sir John Marshal
46. Colour television was introduced on _____ in India
 (1) 23 July, 1927 (2) 15 September, 1959
 (3) 1 May, 1972 (4) 15 August, 1982
47. Who has written the Play 'Ekach Pyala'?
 (1) Ram Ganesh Gadkari (2) Aacharya Aatre
 (3) Vasant Kanetkar (4) Vijay Tendulkar
48. Identify the movie which received an international acclaim?
 (1) Bal Shivaji (2) Sant Tukaram
 (3) Raja Harishchandra (4) Savitri Satyawar
49. In which year, Indian Hockey Team won a gold medal in Olympics?
 (1) 1928 (2) 1932
 (3) 1936 (4) 1956
50. Who was the first women author known for feminist writing?
 (1) Pandita Ramabai (2) Meera Kosambi
 (3) Sharmila Rege (4) Tarabai Shinde

51. The Louvre museum in Paris was established in the _____ century C.E
(1) 16th (2) 17th
(3) 18th (4) 19th
52. On _____ the mobile phone services started in India
(1) 22 August, 1993 (2) 22 August, 1994
(3) 22 August, 1995 (4) 22 August, 1996
53. Find out the option of correct alternatives
- | | |
|--|------------------------------------|
| 'A' Group | 'B' Group |
| A. Indian museum | (I) Delhi |
| B. National Museum | (II) Kolkata |
| C. Shivaji Maharaj Vaastu Sangrahalaya | (III) Hyderabad |
| D. Salarjang Museum | (IV) Mumbai |
| (1) A – II, B – I, C – IV, D - III | (2) A – IV, B – III, C – II, D - I |
| (3) A – I, B – II, C – III, D - IV | (4) A – III, B – IV, C – I, D - II |

54. Identify the place which is famous for caves, has been shown in the picture



- (1) Gharapuri
(2) Verul
(3) Ajanta
(4) Karla
55. Where did the Government of India establish "The Film and Television Institute" of India in 1960?
(1) Delhi
(2) Mumbai
(3) Chennai
(4) Pune
56. In the year 1983, the Indian Cricket team won the world cup under the captainship of ____
(1) Sunil Gavaskar
(2) Kapil Dev
(3) Sachin Tendulkar
(4) Sourav Ganguli
57. Constitution are created by ____ committee of the Election Commission.
(1) Timetable
(2) Voting
(3) Delimitation
(4) Selection
58. Which organization was established in 1920 to resolve the issue of workers?
(1) All India Trade Union Congress
(2) Indian Institute of Technology
(3) Centre for Development Union
(4) National Mill Labour Organization
59. Which country is not included in the five permanent members of the security council of the United Nations?
(1) England
(2) France
(3) China
(4) India
60. After which Lok Sabha Elections, the system of one party emerging as dominant party came to an end? Since then different parties began to come together to form coalition governments.
(1) 1977
(2) 1989
(3) 1995
(4) 2001
61. Features of good governance are given below. Identify the wrong option out of it.
(1) Transparency in working of the government
(2) Responsive government
(3) Just and all-inclusive development
(4) Unaccountable government
62. Which is the main demand of the tribal movement?
(1) Accept the rights of tribes over forests
(2) Movements against the revenue collection
(3) Tenancy laws
(4) Decentralization of power
63. Choose the option, which is not only a political form of democracy?
(1) Election
(2) Voting
(3) Government Structure
(4) Protection of Human Values
64. Which country is not involved in the central powers of the first world war?
(1) Germany
(2) Ottoman Empire
(3) Bulgaria
(4) Italy
65. Identify the bird from the Brazil which is huge in size and fly high in the sky?
(1) Condor
(2) Macaws
(3) Piranhas
(4) Puma

66. Identify the correct option from the pairs given below:
- | | |
|-----------------------------------|-----------------------------------|
| Agents | Landforms |
| A. River | I. Hanging Valley |
| B. Wind | II. Stalactite |
| C. Glaciers | III. Sand dune |
| D. Ground water | IV. Canyon |
| (1) A – I, B – II, C – III, D- IV | (2) A – II, B – I, C – IV, D- III |
| (3) A – IV, B – III, C – I, D- II | (4) A – III, B – IV, C – II, D- I |
67. Which place in western Rajasthan is driest part of India?
 (1) Mounsinram (2) Cherapunji
 (3) Jodhpur (4) Jaisalmer
68. Settlements become sparse as we move in the central part of Brazil because:
 (1) This area has favourable climate and an ideal for human settlements
 (2) Area is covered by thick dense equatorial rainforests
 (3) Area has good transportation system
 (4) fertile soil (rich soil) has been found in this area.
69. Which of the following is not the tributary of Sindhu river?
 (1) Chenab (2) Satluj
 (3) Betva (4) Ravi
70. Observe the outline map of Brazil and identify the forest type shown by shaded part.



- | | |
|------------------------|----------------------------|
| (1) Swamy lands | (2) Thorny shrubs |
| (3) Equatorial forests | (4) Hot Deciduous forests. |
71. Identify the tributary of river Sindhu which originates near Man Sarovar and flows west – ward:
 (1) Jhelum (2) Ravi
 (3) Chenab (4) Satluj
72. Identify the correct option which shows percentage of urban population
- | | |
|--|---|
| Group A
[Percentage of Urban Population] | Group B
[State / Union Territory] |
| 1. 21-40 | A. Tripura |
| 2. 41-60 | B. Delhi |
| 3. 61-80 | C. Maharashtra |
| 4. 81-100 | D. Goa |
| (1) 1-A, 2-C, 3-D, 4-B | (2) 1-D, 2-B, 3-A, 4-C |
| (3) 1-C, 2-A, 3-B, 4-D | (4) 1-B, 2-D, 3-C, 4-A |
73. The official Brazilian time is _____ behind GMT.
 (1) 5 hours 30 minutes (2) 3 hours 50 minutes
 (3) 3 hours (4) 4 hours
74. Which of the following option indicates sparse density of population distribution?
 (1) mountainous hilly regions – dry desert – dense forests
 (2) hilly region – dense forests – industries
 (3) dry desert – plain lands – fertile lands
 (4) availability of water – mountainous regions – plain lands

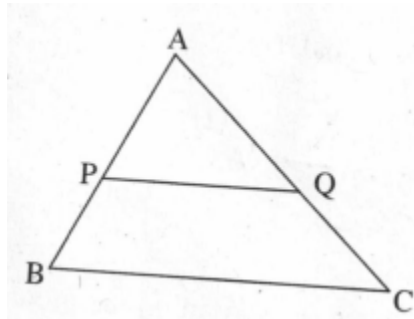
75. Identify the correct statement:
- (1) India has lower national income as compared to Brazil
 - (2) Brazil has higher national income as compared to India
 - (3) The per capita income of Brazil is lower than India
 - (4) The per capita income of India is lower than Brazil
76. Which one is not the Fold mountain?
- (1) The Himalayas
 - (2) The Black Forest
 - (3) The Rockies
 - (4) The Aravalis
77. _____ longitude is the Indian standard Time (IST)
- (1) $80^{\circ} 30'$ East longitude
 - (2) $82^{\circ} 30'$ West longitude
 - (3) $82^{\circ} 30'$ East longitude
 - (4) 82.5° East longitude
78. Identify the state of the Brazil which does not has coastline,
- (1) Rio de Janeiro
 - (2) Sao Paulo
 - (3) Goias
 - (4) Bahira
79. Identify the correct option which shows right order of neighbouring countries lies from south to north direction.
- A. Argentina
 - B. Peru
 - C. Uruguay
 - D. Bolivia
 - (1) C, A, D, B
 - (2) B, A, D, C
 - (3) D, C, B, A
 - (4) A, B, D, C
80. Which one of the following is not used to measure salinity of the sea water?
- (1) Hydrometer
 - (2) Barometer
 - (3) Refractometer
 - (4) Salinometer
81. What is the sum of all natural numbers from 1 to 1000 that are divisible by 7?
- (1) 61061
 - (2) 71271
 - (3) 71071
 - (4) 73371
82. 160 Shares of face value Rs. 100 were purchased when the market value was Rs 120 . Company had declared 20% dividend. Find the rate of return on the investment
- (1) 16.67%
 - (2) 15.67%
 - (3) 14.67%
 - (4) 13.67%
83. $\frac{x^3 + 7x^2 - x - 7}{x^2 + 6x - 7} = ?$
- (1) $\frac{(x-1)}{(x+1)}$
 - (2) $\frac{(x+1)}{(x+7)}$
 - (3) $(x-1)$
 - (4) $(x+1)$
84. A boat takes 3 hours to travel 30km downstream and takes 5 hours to return to the same spot upstream. Find the speed of the boat in still water. (km/hr)
- (1) 10km/hr
 - (2) 8km/hr
 - (3) 6km/hr
 - (4) 5km/hr
85. Find the difference between the sum of all even numbers from 1 to 1000 and the sum of all odd numbers from 1 to 1000
- (1) 0
 - (2) 250
 - (3) 500
 - (4) 1000
86. From a frequency distribution table if $N = 100$, $h = 10$ c.f = 38 $f = 18$, $L = 50$, then find the median for the distribution. Choose the correct alternative
- (1) 56.67
 - (2) 55.76
 - (3) 56.76
 - (4) 55.87
87. If the geometric mean of $(21-x)$ and $(35-x)$ is $(27-x)$. Then find the value of x^2 .
- (1) 4
 - (2) 25
 - (3) 16
 - (4) 9

88. The difference between the diagonals of a rhombus is 4 cm and the area of the rhombus is 96cm^2 . Then find the difference between the length of the smaller diagonal and the length of the side of the rhombus.
- (1) 2 cm (2) 3 cm
(3) 4 cm (4) 6 cm

89. A shopkeeper sold a bicycle to a customer for Rs. 10304 including GST. The rate of GST was 12%. Find SGST payable to him.
- (1) Rs. 1104 (2) Rs. 552
(3) Rs. 1210 (4) Rs. 605

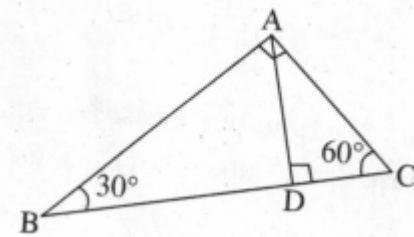
90. If $D = \begin{vmatrix} 3\sqrt{5} & 6 \\ 5 & m \end{vmatrix} = 0$ Find the value of m.
- (1) $\sqrt{5}$ (2) $4\sqrt{5}$
(3) $\sqrt{3}$ (4) $2\sqrt{5}$

91. In triangle ABC seg $PQ \parallel$ side BC. Seg PQ divides $\triangle ABC$ in two parts which are equal in areas. Which of the following alternatives indicate the ratio $\frac{BP}{AB}$?



- (1) $\frac{\sqrt{2}-1}{\sqrt{2}}$ (2) $\frac{\sqrt{2}+1}{\sqrt{2}}$
(3) $\frac{2+\sqrt{2}}{\sqrt{2}}$ (4) $\frac{2-\sqrt{2}}{2}$

92. Two triangles of the angles $30^\circ - 60^\circ - 90^\circ$ are joined together as shown in the figure and $\triangle BAC$ is formed. Which of the following is the ratio of perimeter of $\triangle ABD$ to the perimeter of $\triangle ACD$.



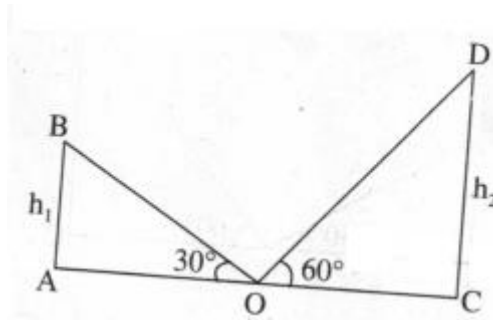
- (1) $2 : \sqrt{3}$ (2) $\sqrt{3} : 1$
(3) $3 : \sqrt{3}$ (4) $\sqrt{3} : 2$

93. The circles with centres P and Q have different radius. They touch each other at T. A line passing through T meets the circle at A and B respectively. Which of the following statement is true?
- (1) $\text{SegPA} \cong \text{SegQB}$ (2) $\text{SegPa} \parallel \text{SegQB}$
(3) SegPA and SegQB are perpendiculars (4) SegPA and SegQB will intersect each other

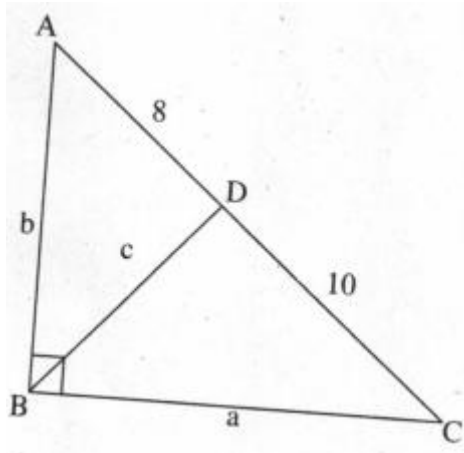
94. Which of the following points are not on the X-axis?
P(0,3), Q(1,0), R(0,-1), S(-5,0) and T(1,2)
- (1) Only P and R (2) Only Q and S
(3) Only P, R and T (4) Only Q, S and T

95. A pole of height 6m casts shadow of $2\sqrt{3}\text{m}$ on the ground. Find the angle of elevation to the sun.
- (1) 90° (2) 45°
(3) 30° (4) 60°

96. Which of the following are the co-ordinates of the centre of the circle that passes through $P(6,-6)$, $Q(3,-7)$ and $R(3,3)$?
- (1) $(3,-2)$ (2) $(2,-3)$
 (3) $(0,0)$ (4) $(2,-2)$
97. The height of a cone is 9cm and the radius of the base is 7cm . The cone is melted and a cuboid is formed. The length of the base of the cuboid is 11cm and breadth is 6cm . Find the height of the cuboid.
- (1) 11cm (2) 9cm
 (3) 7cm (4) 5cm
98. AB and CD are two poles of height h_1 and h_2 respectively. Point 'O' is the centre of segment AC. When the observer looks at the top of the poles from point 'O' the angle of elevation formed is 30° and 60° respectively. Find the ratio of h_1 to h_2 .



- (1) 1:2 (2) 2:3
 (3) $1:\sqrt{3}$ (4) 1:3
99. The diameter of a metallic sphere is 6cm . It was melted to make a wire of diameter 4mm . Find the length of the wire.
- (1) 90mm (2) 90cm
 (3) 9cm (4) 9m
100. In right angled $\triangle ABC$ $\angle B = 90^\circ$ $BD \perp AC$, $AB = b$, $BD = c$, $BC = a$, $AD = 8$ $DC = 10$. Then find 'b'



- (1) $4\sqrt{5}$ (2) 12
 (3) $6\sqrt{5}$ (4) $\sqrt{18}$