NATIONAL TALENT SEARCH EXAMINATION (NTSE-2017) STAGE -1
STATE : PUNJAB PAPER : SAT

Date: 05/11/2017

Max. Marks: 100 **SOLUTIONS** **Time allowed: 90 mins**

51. A body of mass 1 kg initial at rest is moved by a horizontal force of 0.5 N on a smooth frictionless table. The work done by the force in 10 sec. is

(1) 10.5 J (2) 12.5 J (3) 20 J (4) 22 J

Ans. (2)

Sol. $W = F \times s$

$F = ma \quad a = \frac{F}{m} = \frac{0.5}{1}\ m/s^2$

$s = ut + \frac{1}{2}at^2$

$s = 0 + \frac{1}{2} \times 0.5 \times 10 \times 10 = 25\ m$

$W = 0.5 \times 25 = 12.5\ J$

52. A boy hears an echo of his own voice from a distant hill after 2 seconds. The speed of sound in air is 350 m/s. The distance of the hill from the boy is

(1) 175 m (2) 200 m (3) 350 m (4) 250 m

Ans. (3)

Sol. $v = \frac{2s}{t}$

$350 = \frac{2s}{2} = 350\ m$

53. An electric heater consists of 20 m length of manganin wire of 0.23 m^2 cross sectional area. Wattage of heater when potential difference across the heater is 200 V is

(1) 10^6 W (2) 100 W (3) 10^9 W (4) 10^3 W

Ans. (3)

Sol. $P = \frac{V^2}{R}$

$R = \frac{\rho \ell}{A} = \frac{48.2 \times 10^{-8} \times 20}{0.23}$

$P = \frac{V^2}{R} = \frac{200 \times 200 \times 0.23 \times 10^8}{48.8 \times 20} \approx 9.5 \times 10^8 \approx 10^9$ Watts

54. A beam of white light when passes through a glass prism, a spectrum is observed. But when same beam of light passes through hollow grass prism then

(1) Spectrum is same (2) Spectrum become brighter

(3) There will be no spectrum (4) Colours of spectrum reversed

Ans. (3)

Sol. There will be no spectrum.

55. When a current carrying conductor is placed in a direction parallel to the magnetic field, force on conductors is

(1) Zero (2) 100 N (3) 10 N (4) 1000 N

Ans. (1)

Sol. When a current carrying conductor is placed in a direction parallel to the magnetic field, force on conductors is zero.

56. An object of size 4 cm placed perpendicular to the principal axis of concave mirror. The distance of the object from the mirror equals radius of curvature. The size of the image will be

(1) 1 m (2) 2 m (3) 3.5 m (4) 4 cm

Ans. (4)

Sol. $u = R$

$h_1 = 4$ cm

$h_2 = ?$

$$\frac{1}{v}+\frac{1}{(-u)}=\frac{1}{(-f)}$$

$$\frac{1}{v}=\frac{1}{u}-\frac{1}{f}$$

$$\frac{1}{v}=\frac{1}{u}-\frac{1}{u/2} \Rightarrow \frac{1}{v}=\frac{1-2}{u} \Rightarrow \frac{1}{v}=\frac{-1}{u}$$

$v = -u$

$$h_2 = \frac{-v}{u} \times h = 1 \times 4 = 4 \text{ cm}$$

As the object is placed on centre of curvature, the size of image will be equal to the size of object.

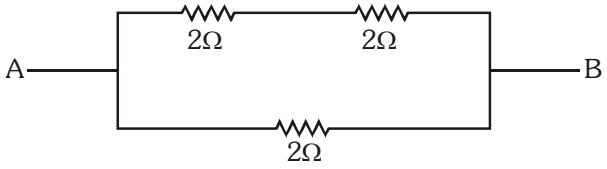
57. The most important safety method used for protecting home appliances from short circuiting or overloading is

(1) Earthing (2) Use of fuse (3) Use of stabilizer (4) Use of electric meter

Ans. (2)

Sol. Use of fuse

58. The equivalent resistance between the points A and B in the circuit as shown in the figure given below is

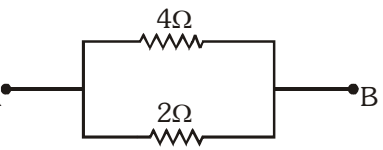


(1) 1 ohm (2) less than 1 ohm

(3) more than 1 ohm (4) 8 ohm

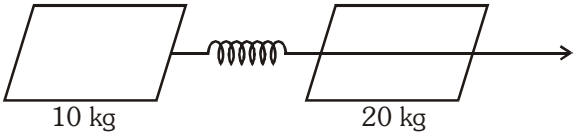
Ans. (3)

Sol. R_{eq} =



$$R_{eq} = \frac{R_1R_2}{R_1+R_2} = \frac{8}{6} = \frac{3}{2}\Omega$$

59. The masses of 10 kg and 20 kg respectively are connected by massless spring. A force of 200 N acts on the 20 kg mass. At the instant shown, the 10 kg mass has an acceleration of 12 m/sec^2. What is the acceleration of 20 kg mass ?



(1) 12 m/sec^2 (2) 4 m/sec^2 (3) 20 m/sec^2 (4) 5 m/sec^2

Ans. (2)

Sol. $F = m_1a_1 + m_2a_2$

$200 = 10 \times 12 + 20a_2$

$200 - 120 = 20a_2$

$80 = 20a_2$

$a_2 = 4$ m/s^2

60. A bullet of mass 0.1 kg is fired with a speed of 100 m/sec., the mass of gun is 50 kg. The velocity of recoil is

(1) 0.2 m/sec (2) 0.1 m/sec (3) 0.5 m/sec (4) 0.05 m/sec

Ans. (1)

Sol. $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

$0 = 0.1 \times 100 - 50\ v_2$

$v_2 = \frac{10}{50} = 0.2$ m/s

61. Which of the following frequency of sound can be generated by a vibrating simple pendulum as well as by the vibrating vocal cords of a rhinocerous?

(1) 8 Hz (2) 25 Hz (3) 10 Hz (4) 15000 Hz

Ans. (3)

Sol. 10 Hz

62. Which of the following is not an example of biomass energy source?

(1) Wood (2) Garbage (3) Atomic energy (4) Coal

Ans. (3)

Sol. Atomic energy

63. A needle placed 45 cm from a lens forms an image on a screen placed 90 cm on the other side of lens, focal length and type of lens is

(1) +10cm, Convex lens (2) +30 cm, Convex lens (3) +30 cm, Concave lens (4) +10 cm, Concave lens

Ans. (2)

Sol. u = 45 cm

v = 90 cm

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{90} - \frac{1}{(-45)} = \frac{1}{f}$

$\frac{1}{90} + \frac{1}{45} = \frac{1}{f}$ $\frac{1+2}{90} = \frac{1}{f}$

$f = \frac{90}{3} = 30$ cm

As the image is formed on the other side of lens, it is a convex lens.

64. If 1.5 moles of oxygen gas combines with solid Aluminium to form Al_2O_3. What is the mass of Aluminium used in the reaction?

(1) 27 gm (2) 54 gm (3) 40.5 gm (4) 81 gm

Ans. (2)

Sol. $4Al + 3O_2 \longrightarrow 2Al_2O_3$

3 moles of O_2 combines with Al = 4 moles

1 mole of O_2 combines with Al = $\frac{4}{3}$ moles

1.5 moles of O_2 combines with Al = $\frac{4}{3} \times 1.5 = 2$ moles

Mass of Al in $Al_2O_3 = 2 \times 27 = 54$ g

65. A student test the pH of distilled water and found that the colour of pH paper changed to green. He checked the pH again after dissolving a pinch of common salt in water. The colour of pH paper this time will be :

(1) Green (2) Yellow (3) Red (4) Blue

Ans. (1)

Sol. pH paper shows green colour for neutral solution. Common salt is neutral in nature.

66. On electrolysis of brine solution the products formed are :

(1) Na and Cl_2 (2) H_2, O_2 and Cl_2 (3) H_2, Cl_2 and NaOH (4) NaOH, Cl_2 and O_2

Ans. (3)

Sol. $\underbrace{NaCl + H_2O}_{\text{Brine}} \xrightarrow{\text{electrolysis}} NaOH + H_2\uparrow + Cl_2\uparrow$

67. What is the valency of an element having atomic number 18?

(1) 2 (2) 8 (3) Zero (4) 6

Ans. (3)

Sol. Atomic no. 18 is a noble gas i.e. Argon has valency zero.

68. Number of molecules present in 18g and 18u of water respectively.

(1) 6.023×10^{23} and 1 (2) 6.023×10^{23} and 18

(3) 18 and 6.023×10^{23} (4) 1 and 6.023×10^{23}

Ans. (1)

Sol. 18 g of water contians 1 mole of molecules of water = 6.023×10^{23} molecules.

18 u of water contians 1 molecule of water because molecular mass of H_2O = 18 u.

69. By adding acetic acid to solid "X" a colourless and odourless gas "Y" is evolved. The gas "Y" turns lime water milky. What are X and Y.

(1) X is Sodium carbonate and Y is CO_2. (2) X is Sodium hydroxide and Y is CO_2.

(3) X is Sodium acetate and Y is CO_2. (4) X is Sodium bicarbonate and Y is SO_2.

Ans. (1)

Sol. Acetic acid + Solid X $\longrightarrow$ CO_2 (gas Y)

$\downarrow$

Milky $\longleftarrow$ Lime water

CH_3COOH + Metal carbonates or bicarbonates (X) $\longrightarrow$ CO_2 (Y)

Acetic Acid

$\downarrow$

$CaCO_3$ $\longleftarrow$ Lime water

Milky $Ca(OH)_2$

70. High melting point of a compound indicates

(1) Strong intermolecular forces. (2) Kinetic energy of molecules is more.

(3) Speed of molecules is more. (4) Compound can diffuse easily.

Ans. (1)

Sol. Strong intermolecular forces cause high melting point of a compound. e.g. Ionic compounds are strong with high melting point.

71. A metal on heating in presence of air gives compound which is soluble in water and have high melting point. The metal is :

(1) Calcium (2) Carbon (3) Silicon (4) Iron

Ans. (1)

Sol. Group 2 element generally have high melting point.

$Ca + O_2 \longrightarrow CaO$

$CaO + H_2O \longrightarrow Ca(OH)_2$ soluble in water.

72. An element which is essential constituent of all organic compounds belongs to which group in Periodic Table.

(1) Group 2 (2) Group 14 (3) Group 16 (4) Group 17

Ans. (2)

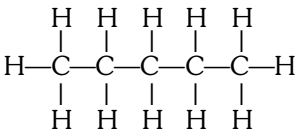
Sol. Carbon is essential constituent of all organic compounds belongs to group 14.

73. How many covalent bonds are present in Pentane?

(1) 8 (2) 10 (3) 16 (4) 14

Ans. (3)

Sol.



16 Covalent bonds

74. Which one of the following is not an isoelectronic with Neon atom?

(1) $_8O^{-2}$ (2) $_{11}Na^{+1}$ (3) $_9F^{-1}$ (4) $_{12}Mg^{+1}$

Ans. (4)

Sol. Neon atomic no. = 10 have 10 electrons.

$_{12}Mg^{+1} \Rightarrow$ has 11 electrons and is not isoelectronic (same no. of electrons) with Neon.

75. The formula of sulphate of element X is $X_2(SO_4)_3$. The formula of nitride of element X is

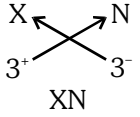
(1) X_2N (2) XN_2 (3) XN (4) X_2N_3

Ans. (3)

Sol. Valency of X in $X_2(SO_4)_3 = 3$.

Nitride = N^{3-}

Formula of nitride of X



XN

76. Three test tubes containing :

Test Tube X : 5ml of HCl

Test Tube Y; 5ml of HNO_3

Test Tube Z : 15ml of HCl + 5ml of HNO_3

A small piece of metal was added in all the three test tubes. It dissolves only in Test Tube Z. The metal is:

(1) Al (2) Au (3) Cu (4) Ag

Ans. (2)

Sol. In test tube Z : 15 ml of HCl + 5 ml of HNO_3.

Ratio 3 : 1 of HCl and HNO_3 is known as aqua regia, which is used to dissolve noble metals like Au (Gold) and Pt (Platinum).

77. Match the column I with the column II.

	Column I		**Column II**
(i)	Renal artery	(a)	It stores the urine untill it is released through the Urethra.
(ii)	Kidney	(b)	It passes urine from kidney to urinary bladder.
(iii)	Ureter	(c)	It filters the blood and forms urine.
(iv)	Urinary bladder	(d)	It bring blood to the kidney for filtering waste.

(1) i-d, ii-c, iii-b, iv-a (2) i-a, ii-b, iii-c, iv-d (3) i-b, ii-a, iii-d, iv-c (4) i-c, ii-b, iii-a, iv-b

Ans. (1)

Sol. (i) Renal artery – It bring blood to the kidney for filtering waste.

(ii) Kidney – It filters the blood and forms urine.

(iii) Ureter – It passes urine from kidney to urinary bladder.

(iv) Urinary bladder – It stores the urine untill it is released through the Urethra.

78. Winch one of the following is the function of the enzymes of Pancreatic Juice?

(1) trypsin digests protein and lipase digests carbohydrates

(2) trypsin digests emulsified fats and lipase digests proteins

(3) trypsin and lipase digest fats

(4) trypsin digests proteins and lipase digests emulsified fats.

Ans. (4)

Sol. Pancreatic juice contains protein digesting enzyme trypsin. It also has lipase which acts on emulsified fats.

79. Which of the following is not a correct pair ?

(1) Adrenaline : Piluitary gland (2) Testosterone : Testes

(3) Estrogen : Ovary (4) Thyroxine : Thyroid gland

Ans. (1)

Sol. Adrenaline is released by adrenal gland.

80. Pine and Deodar are the example of

(1) Gymnosperms (2) Pteridophyta (3) Thallophyta (4) Bryophyta

Ans. (1)

Sol. Pine and deodar are the examples of gymnosperms.

81. Khadins, Bundhis and Ahars are ancient structures that are example of

(1) Grain storage (2) Wood storage (3) Water harvesting (4) Soil conservation

Ans. (3)

Sol. Khadins, Bundhis and Ahars are the traditional methods of water harvesting.

82. Read the following statements and select the correct option

Statement I : Snails and Mussels are Molluscans.

Statement II : Sea Urchins and Scorpions are Echinodermates

(1) only statement I is true (2) only statement II is true

(3) Both statements I & II are true (4) Both statements I & II are false

Ans. (1)

Sol. Snails and mussels are molluscans. Sea urchins are echinoderms and scorpions are arthropods.

83. .....in Eukaryotes is separated from the cytoplasm by double layered membrane and it directs the life process of the cell.

(1) Golgi Apparatus (2) Nucleus (3) Lysosome (4) Ribosome

Ans. (2)

Sol. Nucleus is a double membrane structure that directs the life process of the cell. Nucleus is known as the director of cell.

84. A feature that is common in yeast, amoeba, paramecium is

(1) They all are multicellular (2) They all reproduce by budding

(3) They all reproduce by binary fission (4) They all are unicellular

Ans. (4)

Sol. Yeast is unicellular organism and reproduce by budding. Amoeba and paramecium are unicellular organisms and reproduce by binary fission.

85. Which blood constituent makes up more of the volume of blood ?

(1) Red blood cells (2) Plasma (3) Blood protein (4) White blood cells

Ans. (2)

Sol. Plasma forms 55% of the blood and formed elements (RBC, WBC & Platelets) form 45% of the blood.

86. Homologous organs are.....

(1) Dissimilar in origin, similar in function. (2) Dissimilar in origin and dissimilar in function.

(3) Similar in origin and similar in function. (4) Similar in origin and dissimilar in function.

Ans. (4)

Sol. Homologous organs are those organs that have basic similar structure but have become modified to perform different functions.

87. What is the correct direction of flow of electrical impulses in nerve cells?

(1) 

(2) 

(3) 

(4) 

Ans. (3)

Sol. Electrical impulse is received by dendrites and is conducted to Axon. Synapse is the junction between dendrite of one neuron and axon of other enuron.

88. You observed a slide of animal tissue and observed (i) long cylindrical and unbranched cells (ii) They had dark and light bands. The tissue could be of

(1) Unstriated muscle fibres (2) Neurons

(3) Striated muscle fibres (4) Cardiac muscle fibres

Ans. (3)

Sol. Striated or skeletal muscle fibres are long, cylindrical, unbranched with alternate light and dark bands (striations)

89. Which organ is infected when a person suffers from Jaundice?

(1) Bones (2) Liver (3) Lungs (4) Nervous system

Ans. (2)

Sol. Liver is affected in Jaundice.

90. The animals having jointed legs belongs to phylum

(1) Annelida (2) Arthropoda (3) Mollusca (4) Nematoda

Ans. (2)

Sol. Arthropoda phylum includes animals having jointed legs and segmented bodies.

91. If $p + q + r = 0$ then the value of $\frac{2p^2(q+r)+2q^2(p+r)+2r^2(p+q)}{pqr}$ will be

(1) $3pqr$ (2) $\frac{1}{pqr}$ (3) 6 (4) –6

Ans. (4)

Sol. $\frac{2p^2(q+r)+2q^2(p+r)+2r^2(p+q)}{pqr}$

$= \frac{2p^2(-p)+2q^2(-q)+2r^2(-r)}{pqr}$ [$\because p + q + r = 0$]

$= \frac{-2[p^3+q^3+r^3]}{pqr} = \frac{-2(3pqr)}{pqr}$ [If $p + q + r = 0$, $p^3 + q^3 + r^3 = 3pqr$]

$= -6$

92. A circle is inscribed in a square of side 2.5cm. Another circle is circumscribing this square. The ratio of areas of outer circle and inner circle is

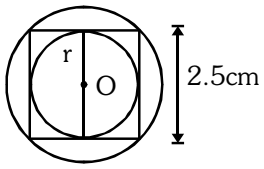
(1) $1 : \sqrt{2}$ (2) $\sqrt{2} : 1$ (3) 2 : 1 (4) $\sqrt{3} : 1$

Ans. (3)

Sol. Let radius of inner circle of r and that of outer circle be R.

$2r = 2.5$

$r = \frac{2.5}{2}$



And $2R = 2.5\sqrt{2} \Rightarrow R = \frac{2.5}{\sqrt{2}}$

Required ratio $= \frac{\pi R^2}{\pi r^2} = \frac{\left(\frac{2.5}{\sqrt{2}}\right)^2}{\left(\frac{2.5}{2}\right)^2} = \frac{4}{2} = \frac{2}{1}$

93. If $x = \frac{1}{\sqrt{3}-1}$ then find the value of $4x^3 + 2x^2 - 8x - 3$.

(1) 0 (2) 2 (3) –2 (4) $\sqrt{2}$

Ans. (1)

Sol. $x = \frac{1}{\left(\sqrt{3}-1\right)} = \frac{\sqrt{3}+1}{2}$

Then $x^3 = \left(\frac{\sqrt{3}+1}{2}\right)^3 = \frac{3\sqrt{3}+1+9+3\sqrt{3}}{8} = \frac{10+6\sqrt{3}}{8}$

$x^2 = \left(\frac{\sqrt{3}+1}{2}\right)^2 = \frac{4+2\sqrt{3}}{4} = \frac{2\left(2+\sqrt{3}\right)}{4} = \frac{2+\sqrt{3}}{2}$

Then $4x^3 + 2x^2 - 8x - 3 = \frac{4\times 2\left(5+3\sqrt{3}\right)}{8} + \frac{2\left(2+\sqrt{3}\right)}{2} - 8\left(\frac{\sqrt{3}+1}{2}\right) - 3$

$= \left(5+3\sqrt{3}\right) + \left(2+\sqrt{3}\right) - 4\left(\sqrt{3}+1\right) - 3$

$= 5 + 3\sqrt{3} + 2 + \sqrt{3} - 4\sqrt{3} - 4 - 3$

$= 0$

94. How many revolutions will a circular wheel of radius r unit will make to cover a distance of 100 times its diameter ?

(1) $\frac{100}{\pi}$ (2) 100π (3) $\frac{\pi}{100}$ (4) $\frac{50}{\pi}$

Ans. (1)

Sol. Distance to be covered = 100 (2r) = 200r

Distance covered in 1 revolution = $2\pi r$

No. of revolutions = $\frac{200r}{2\pi r} = \frac{100}{\pi}$

95. If $\tan\phi + \cot\phi = 1$ then the value of $\sin\phi + \cos\phi$ will be equal to (where ϕ is an acute angle)

(1) 0 (2) $\sqrt{2}$ (3) $\sqrt{3}$ (4) 1

Ans. (3)

Sol. $\tan\phi + \cot\phi = 1$ (given)

$\frac{\sin\phi}{\cos\phi} + \frac{\cos\phi}{\sin\phi} = 1 \quad \Rightarrow \frac{\sin^2\phi + \cos^2\phi}{\sin\phi\cos\phi} = 1$

$\Rightarrow \sin\phi\cos\phi = 1$ ..... (i)

Let $\sin\phi + \cos\phi = x$

Then $[\sin\phi + \cos\phi]^2 = x^2$

$\Rightarrow \sin^2\phi + \cos^2\phi + 2\sin\phi\cos\phi = x^2$

$\Rightarrow 1 + 2 = x^2$ [By equation (i)]

$\Rightarrow x^2 = 3$

$\Rightarrow x = \sqrt{3}$

96. If pth term of an AP is q and qth term is p then mth term of this AP will be :

(1) $p + q + m$ (2) $p + q - m$ (3) $p - q - m$ (4) $p - q + m$

Ans. (2)

Sol. $T_p = q \Rightarrow a + (p - 1)d = q$

$T_q = p \Rightarrow a + (q - 1)d = p$

On subtracting both equations

$\Rightarrow [p - 1 - q + 1]d = q - p$

$(p - q)d = -(p - q)$

$\boxed{d = -1}$

Then $a + (p - 1)(-1) = q \quad \Rightarrow \boxed{d = q + p - 1}$

$T_m = a + (m - 1)\,d$

$= q + p - 1 + (m - 1)(-1)$

$= q + p - 1 - m + 1$

$T_m = q + p - m$

97. Two dice are thrown. Find the probability that sum of numbers of both up sides of both dice is a perfect square.

(1) $\frac{1}{6}$ (2) $\frac{7}{36}$ (3) $\frac{5}{36}$ (4) 0

Ans. (2)

Sol. Sum of numbers on both dice should be 1, 4, 9, 16, 25 .....

Favourable outcomes = {(1, 3), (2, 2), (3, 1), (3, 6), (4, 5), (5, 4), (6, 3)}

Total outcomes = 36

Required probability = $\frac{7}{36}$

98. From the top of tower of h m high, the angles of depression of two objects, which are in line with the foot of the tower are α and β ($\beta > \alpha$). Find the difference between two objectives.

(1) $h(\tan\alpha - \tan\beta)$ (2) $h(\cot\alpha - \tan\beta)$ (3) $h(\cot\alpha - \cot\beta)$ (4) $h(\cot\alpha + \cot\beta)$

Ans. (3)

Sol. As shown in figure

Let BC = x units

BD = y units

In ΔABC

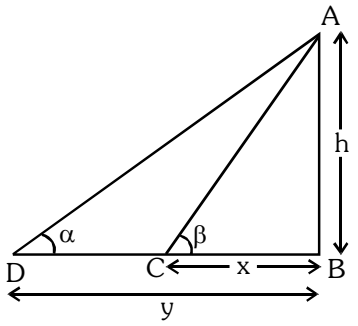
$\tan\beta = \frac{h}{x}$

$\Rightarrow x = \frac{h}{\tan\beta}$

In ΔADB

$\tan\alpha = \frac{h}{y}$

$y = \frac{h}{\tan\alpha}$



Required difference = $y - x = \frac{h}{\tan\alpha} - \frac{h}{\tan\beta} = h[\cot\alpha - \cot\beta]$

99. If the distance between the points (4, q) and (1, 0) is 5 units then the value of q is -

(1) 4 (2) –4 (3) ± 4 (4) 0

Ans. (3)

Sol. Distance = 5

$\Rightarrow \sqrt{(4-1)^2+(q-0)^2} = 5$

$\Rightarrow 3^2 + q^2 = 5^2$

$\Rightarrow q^2 = 16$

$\Rightarrow q = \pm 4$

100. The area of an equilateral triangle is $49\sqrt{3}cm^2$. Taking each vertex as centre, circles are described with radius equal to half the length of the side of the triangle. Find the area of the triangle. Find the area of the part of the triangle which is not included in these circles. ($\sqrt{3} = 1.73$, $\pi = \frac{22}{7}$)

(1) $84cm^2$ (2) $77.7cm^2$ (3) $7.77cm^2$ (4) $70.7cm^2$

Ans. (3)

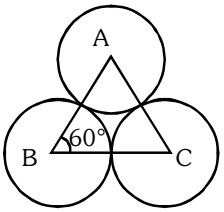
Sol. Let AB = 2r

$ar(\Delta ABC) = 49\sqrt{3}$

$\frac{\sqrt{3}}{4}(2r)^2 = 49\sqrt{3}$

$\Rightarrow \sqrt{3}\,r^2 = 49\sqrt{3}$

$r = 7$ cm



Required area = $ar(\Delta ABC) - 3\left[\pi r^2 \times \frac{60°}{360°}\right]$

$= 49\sqrt{3} - \frac{\pi r^2}{2}$

$= 49\sqrt{3} - \frac{22}{7} \times \frac{1}{2} \times 49$

$= 49\sqrt{3} - 77$

$= 7.77\ cm^2$

101. If $\sqrt{(0.04 \times 0.4x)} = 0.4 \times 0.04\sqrt{y}$. Then the value of $\frac{x}{y}$ is

(1) 0.0016 (2) 0.16 (3) 0.016 (4) 1.6

Ans. (3)

Sol. $\sqrt{(0.04)(0.4x)} = (0.4)(0.04)\sqrt{y}$

squaring both side then

$(0.04)(0.4x) = (0.4)^2 (0.04)^2 y$

$\Rightarrow x = (0.4)(0.04)y$

$\Rightarrow \frac{x}{y} = (0.4)(0.04) = 0.016$

102. One litre of water weighs 1 kg. How many cubic millimetres of water weigh 0.1 gm ?

(1) 100 (2) 10 (3) 1 (4) 0.1

Ans. (1)

Sol. Weight of 1000g water = 1 litre = $10^6\,mm^3$

So, weight of 1g water = $\frac{10^6}{10^3}mm^3 = 10^3 mm^3$

So, weight 0.1g water = $(0.1)(10^3)\ mm^3$

$= 100\ mm^3$

103. If $x = \sqrt[3]{2\frac{93}{125}}$, then the value of x is :

(1) $2\frac{1}{5}$ (2) $1\frac{2}{5}$ (3) $3\frac{4}{5}$ (4) $4\frac{1}{5}$

Ans. (2)

Sol. $x = \sqrt[3]{2\frac{93}{125}}$

$\Rightarrow x = \sqrt[3]{\frac{343}{125}} = \frac{7}{5}$

$\Rightarrow x = 1\frac{2}{5}$

104. If x men can do a piece of work in 8 days and (x + 4) men can do the same work in 6 days then x is equal to :

(1) 10 (2) 6 (3) 12 (4) 24

Ans. (3)

Sol. x men can do work in 8 days

then 1 man can do it in 8X days

(x + 4) men can do work in 6 days

then 1 man can do in 6 (x + 4) days

So $8x = 6(x + 4)$

$2x = 24$

$\Rightarrow \boxed{x = 12}$

105. If $x^2 + y^2 + z^2 = r^2$ where $x = r \sin A \cos B$, $y = r \sin A \sin B$ then Z has one of the following values :

(1) r sin B (2) r cos A (3) r tan A cos B (4) r tan A tan B

Ans. (2)

Sol. $x^2 + y^2 = r^2\sin^2A\cos^2B + r^2\sin^2A\sin^2B$

$= r^2\sin^2A(\cos^2B + \sin^2B)$

$x^2 + y^2 = r^2\sin^2A$

Then $x^2 + y^2 + Z^2 = r^2\sin^2A + Z^2$

$r^2 = r^2\sin^2A + Z^2$

$Z^2 = r^2(1 - \sin^2A)$

$Z^2 = r^2\cos^2A$

$\Rightarrow Z = r \cos A$

106. Find the solutions for 'x' in eq. $\frac{1}{a+b+x}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}$ is :

(1) –a, b (2) –a, –b (3) a, –b (4) a, b

Ans. (2)

Sol. $\frac{1}{a+b+x}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}$

$\Rightarrow \frac{1}{a+b+x}-\frac{1}{x}=\frac{1}{a}+\frac{1}{b}$

$\Rightarrow \frac{1}{a+b+x}-\frac{1}{x}=\frac{b+a}{ab}$

$\frac{x-a-b-x}{(a+b+x)x}=\frac{b+a}{ab}$

$\frac{-1}{(a+b+x)x}=\frac{1}{ab}$

$\Rightarrow x^2 + (a + b)x + ab = 0$

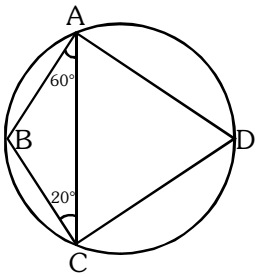
$\Rightarrow x^2 + ax + bx + ab = 0$

$\Rightarrow x(x + a) + b (x + b) = 0$

$\Rightarrow (x + a) (x + b) = 0$

$\Rightarrow x = -a, -b$

107. In the given figure, ABCD is a cyclic quadrilatical. If $\angle BAC = 60°$, $\angle BCA = 20°$ then find the value of $\angle ADC$?



(1) 15° (2) 50° (3) 80° (4) 40°

Ans. (3)

Sol. In ΔABC

$60° + \angle ABC + 20° = 180°$

$\Rightarrow \angle ABC = 100°$

Since $\square ABCD$ is cyclic quadrilateral

So $\angle ABC + \angle ADC = 180°$

$\Rightarrow \angle ACD = 180° - 100°$

$\Rightarrow \angle ADC = 80°$

108. A copper wire when bent in the form of a square, encloses an area of 484 cm^2. If the same wire is bent in the form of circle, the area enclosed by it is :

(1) 210 cm^2 (2) 616 cm^2 (3) 512 cm^2 (4) 54 cm^2

Ans. (2)

Sol. Let sides of square = 'a' cm

and radius of circle = 'r' cm

Then $a^2 = 484$

$a = 22$ cm

According to question

$4a = 2\pi r$

$2 \times 22 = \frac{22}{7} \times r \quad \Rightarrow r = 14$ cm

area of circle = $\pi r^2 = \frac{22}{7} \times 14 \times 14 = 616\ cm^2$

109. The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C. If the temperature on Thursday was 4/5th that of Monday. Then the temperature of Thursday was :

(1) 35.5°C (2) 34°C (3) 36.5°C (4) 36°C

Ans. (4)

Sol. Let temperature from Monday to thursday are x, y, z, a respectively

Then $\frac{x+y+z}{3} = 37$

$\Rightarrow x + y + z = 111$ ..... (1)

And $y + z + a = 3 \times 34$

$y + z + a = 102$ .....(2)

Subtracting (2) from (1) then

$x - a = 9$

And $a = \frac{4}{5}x \Rightarrow \frac{5a}{4} = x$

So $\frac{5a}{4} - a = 9$

$\Rightarrow \frac{a}{4} = 9$

$\Rightarrow a = 36$°C

So temperature on thursady = 36°C

110. In a box containing 100 bulbs, 10 are defective. What is the probability that out of a sample of 5 bulbs none is defective.

(1) 10^{-5} (2) $\left(\frac{1}{2}\right)^5$ (3) $\left(\frac{9}{10}\right)^{-5}$ (4) $\left(\frac{9}{10}\right)^5$

Ans. (4)

Sol. Probability of getting nondefective bulbs = $\frac{9}{10}$

In a sample of 5 bulbs probability of getting non defective = $\left(\frac{9}{10}\right)^5$

111. In IMF and World Bank the decisions are taken by

(1) developing nation

(2) a joint council of developed and developing countries

(3) Western industrial powers

(4) least developed nations

Ans. (3)

Sol. In IMF and World Bank, the decisions are taken by Western Industrial Powers

112. What led to town planning of the city of Bombay in 1880 ?

(1) The social tension (2) Poverty

(3) Fear of plague epidemics (4) Riots

Ans. (3)

Sol. Fear of plague epidemics led to the town planning of the city of Bombay in 1880

113. Which of the following novel deals with caste oppression ?

(1) Sultana's Dream (2) Indulekha (3) Saraswati Vijayam (4) Padmarag

Ans. (3)

Sol. 'Saraswati Vijayam' deals with caste oppression

114. Who described Mazzini as ' the most dangerous enemy of our social order ?

(1) Victor Emmanuel II (2) Duke Metterinich (3) Johan Gottfried (4) Lord Byron

Ans. (2)

Sol. Duke Metterinich described Mazzini as the most dangerous enemy of our social order

115. Why was the Vietnam war called the first television war ?

(1) Brought home, stories from soldiers (2) Led to increased sale of teleivision sets

(3) Battle scenes were shown on daily news (4) Television was invented

Ans. (3)

Sol. Vietnam war was called the first television war as for the first time Battle scenes were shown on daily news

116. What said "printing is the ultimate gift of God and the greatest one ?

(1) Charles Dickens (2) J.V. Schely

(3) Mahatma Gandhi (4) Martin Luther

Ans. (4)

Sol. Martin Luther said, "Printing is the ultimate gift of God and the greatest one"

117. Which of the following combination correctly indicates the three flows of international economic exchange?

(1) Capital, goods, raw material (2) Goods, metal, labour

(3) Goods, labour, capital (4) Labour, capital, food grains

Ans. (3)

Sol. Three flows of international economic exchange are - Goods, Labour & Capital

118. The slogan 'Jai Hind' was given by

(1) Lal Bahadur Shastri (2) Subhash Chandra Bose

(3) Jawahar Lal Nehru (4) Ras Behari Bose

Ans. (2)

Sol. Slogan 'Jai Hind' was given by Subhash Chandra Bose

119. What was the relationship of Guru Amardas Ji with Guru Ramdas Ji ?

(1) Father (2) Son (3) Brother (4) Father-in-Law

Ans. (4)

Sol. Guru Amardas ji was the Father-in-Law of Guru Ramdas Ji

120. Name the treaty signed on 26th December, 1846 after First Anglo Sikh War ?

(1) Treaty of Paris (2) Treaty of Lahore (3) Treaty of Bhayrowal (4) Tripartite Treaty

Ans. (2)

Sol. Treaty of Lahore was signed on 26th December, 1846 after First Anglo Sikh War

121. Who established Dal Khalsa ?

(1) Nawab Kapoor Singh (2) Banda Bahadur

(3) Ranjit Singh (4) Guru Gobind Singh Ji

Ans. (1)

Sol. Nawab Kapoor Singh established Dal Khalsa

122. 'Relief', 'Cyclonic' and 'Convectional' are types of which of the following?

(1) Soil (2) Water (3) Rainfall (4) Forests

Ans. (3)

Sol. Relief, Cyclonic and Conventional are types of Rainfall

123. To which of the following, the study of 'Seismology' is related?

(1) Atmosphere (2) Floods (3) Tides (4) Earthquakes

Ans. (4)

Sol. Siesmology is related with Earthquakes

124. What is the area of Chandigarh ?

(1) 114 sq kilometre (2) 1014 sq kilometre (3) 10140 sq kilometre (4) 50362 sq kilometre

Ans. (1)

Sol. 114 sq.km is the area of Chandigarh

125. Which latitude passes approximately through the middle of India ?

(1) Equator (2) Tropic of Cancer (3) Tropic of Capricon (4) Prime Meridian

Ans. (2)

Sol. Tropic of Cancer passes approximately through the middle of India

126. With which agent the features like 'Stalactite' and 'Stalagmite' are related?

(1) Air (2) Sea (3) Underground water (4) Glacier (River of Ice)

Ans. (3)

Sol. Stalactite and Stalagmite are the features developed by Underground water

127. In which state of India the 'Kandla Port' is situated ?

(1) Punjab (2) West Bengal (3) Andhra Pradesh (4) Gujarat

Ans. (4)

Sol. Kandla Port is located in the state of Gujarat

128. Which of the following states has the least population density'?

(1) Bihar (2) Uttar Pradesh (3) Himachal Pradesh (4) Arunachal Pradesh

Ans. (4)

Sol. Arunachal Pradesh has the least population density

129. Which state of India has the maximum area under forests?

(1) Haryana (2) Tripura (3) Rajasthan (4) Karnataka

Ans. (4)

Sol. Karnataka has the maximum area under forests

130. From which language the wordk 'Monsoon' has been derived ?

(1) Hindi (2) Arabic (3) German (4) English

Ans. (2)

Sol. Monsoon has been derived from the Arabic language

131. For what mineral, the mining region of 'Kolar' and 'Ramgiri in India are famous for

(1) Gold (2) Silver (3) Copper (4) Bauxite

Ans. (1)

Sol. Kolar and Ramgiri in India are famous for Gold

132. Which state of India is connected to China (Tibet Region) through Nathula pass?

(1) Meghalaya (2) Assam (3) Sikkim (4) Arunachal Pradesh

Ans. (3)

Sol. Sikkim of India is connected to China through Nathula Pass

133. Who was the Chairman of Drafting Commitee of Indian Constitution ?

(1) Moti Lal Nehru (2) Jawahar Lal Nehru (3) B.R. Ambedkar (4) Rajender Prasad

Ans. (3)

Sol. B.R.Ambedkar was the Chairman of Drafting Committee of Indian Constitution

134. Which of the following is a big challenge to democracy ?

(1) Leaders (2) Political partites (3) Elections (4) Illiterate Citizens

Ans. (4)

Sol. Illiteracy is a big challenge to democracy

135. Which of the following is not the quality of ideal citizens ?

(1) Good health (2) Patriotism (3) Tolerance (4) Illiteracy

Ans. (4)

Sol. Illiteracy is the not the quality of ideal citizens

136. Seats are reserved for women in

(1) Parliament (2) Panchayati Raj Institution

(3) State Legislature (4) Rajya Sabha

Ans. (2)

Sol. Seats are reserved for women in Panchayati Raj Institutions

137. Which type of government is federal governments ?

(1) Centre and State Government (2) Govt. of two States

(3) Centre and two State Government (4) Centre and three State Government

Ans. (1)

Sol. Centre and State Government is a federal governments.

138. How many state governments are functioning in India

(1) 7 (2) 28 (3) 13 (4) 29

Ans. (4)

Sol. 29 state governments are functioning in India

139. An ordinary bill is represented in

(1) Rajya Sabha (2) Lok Sabha

(3) Any house of Parliament (4) Rajya Vidhan Sabha

Ans. (3)

Sol. An ordinary bill can be introduced in any house of Parliament

140. Who is the constitutional head of India

(1) King (2) Queen

(3) Prime Minister (4) President

Ans. (4)

Sol. President is the constitutional head of India

141. Which of the following is not the National Flag ?

(1) Shriomany Akali Dal (2) Bhartiya Janta Party

(3) Indian National Congress (4) Bahujan Samaj Party

Ans. (1)

Sol. Shiromany Akali Dal is a regional party, not a national political party

142. India is a federal state because

(1) Dual judiciary (2) Written constitution

(3) Dual citizenship (4) Share of power between centre and state

Ans. (4)

Sol. India is a federal state because it shares power between Central and State government

143. GDP can be written as _____

(1) General Domestic Product (2) Gross Domestic Product

(3) Gross Development Product (4) General Development Product

Ans. (2)

Sol. GDP stands for Gross Domestic Product

144. Foreign Trade _____

(1) Increases choice of goods (2) Decreases price of goods

(3) Increases competition in the market (4) Decreases earnings

Ans. (3)

Sol. Foreign trade increases competition in the market

145. COPRA full form is

(1) Co-ordination Protection Act (2) Co-education Protection Act

(3) Co-operative Protection Act (4) Consumer Protection Act

Ans. (4)

Sol. Full form of COPRA is Consumer Protection Act

146. Which of these notes are issued by finance department of Govt. of India

(1) ₹ 500 (2) ₹ 100 (3) ₹ 2000 (4) ₹ 1

Ans. (4)

Sol. One Rupee Note is issued by finance department of Government of India

147. What is the impact of green revolution

(1) Forest area increased (2) Air Pollution decreased

(3) Wheat Production Increased (4) Milk Production Increased

Ans. (3)

Sol. Wheat production increased as a impact of Green Revolution

148. Globalisation was stimulated by

(1) Money (2) Transportation (3) Population (4) Computers

Ans. (2)

Sol. Globalisation was stimulated by Transportation

149. A consumer _____

(1) Sells goods and services (2) Buy goods and services

(3) Produces goods and services. (4) Computers

Ans. (2)

Sol. Person who buys goods and services is termed as Consumer

150. What is the time-period of 12th five year plan?

(1) 2002-07 (2) 2007-12 (3) 2012-17 (4) 2017-22

Ans. (3)

Sol. 2012-17 is the time period of 12th five year plan.