Date: 6/11/2016

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

101. A man in a boat. A pulls a rope with a force 100 N. The other end of the rope is tied to a boat B of mass 200 kg. The total mass of boat A and man is 300 kg, disregard the weight of the rope and the resistance of the water. The power developed by the man by the end of the third second is.

(1) 100 W   (2) 200 W   (3) 150 W   (4) 250 W
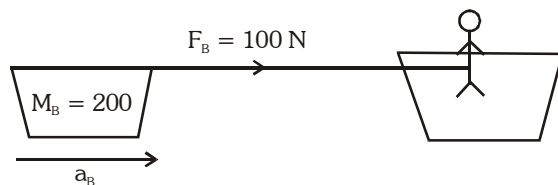
Ans. *(4)*

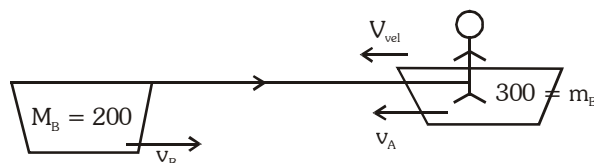**Sol.** $P = F \cdot V_{rel}$

$F_B = m_B a_B$

$100 = 200\, a_B$

$a_B = \dfrac{1}{2}\ ms^{-2}$

$v_B = u_B + a_B t$

$v_B = \dfrac{1}{2} \times 3$

$v_B = \dfrac{3}{2}\ ms^{-1}$

$v_{rel} + v_A = v_B$

$m_B v_B + m_A v_A = 0$

$m_B v_B + m_A (v_B - v_{rel}) = 0$

$200\, v_B + 300\, (v_B - v_{rel}) = 0$

$500\, v_B = 300\, v_{rel}$

$500 \times \dfrac{3}{2} = 300\, v_{rel}$

$500 \times \dfrac{3}{2} = 300\, v_{rel}$

$v_{rel} = \dfrac{5}{2} = 2.5\ m/s$

$P = 100 \times 2.5$

$= 250\ N$

102. A launch takes 3 hours to go downstream from point A to B and 6 hours to come back to A from B. The time taken by the launch to cover the same distance downstream when its engine cutoff is.

(1) 12 hrs. (2) 9 hrs. (3) 4.5 hrs. (4) 18 hrs.

Ans. *(1)*

Sol.

$$\frac{d}{V_m + V_R} = 3 \qquad ....(1)$$

$$\frac{d}{V_m - V_R} = 6 \qquad ......(2)$$

Solving (1) & (2)

$$V_R = \frac{d}{12}$$

T = 12 hours

103. An ammeter and a voltmeter are joined in series to a cell. Their readings are A and V respectively. If a resistance is now joined in parallel with the voltmeter.

(1) A will increase, V will decrease

(2) Both A and V will increase

(3) Both A and V will decrease

(4) A will decreases, V will increase

Ans. *(1)*

Sol. A will increase, v will decrease as net current will increase but current throught voltmeter will decrease.

104. System is shown in the figure. Light rays from a point object are first deviated by a prism and then focused by a thin lens of focal length f. The prism is made of material with refractive index 3/2 and has small apex angle 2° i.e. small angle approximations are valid $\sin\alpha$ $(\alpha + \beta) = \alpha + \beta$, where α and β are angles. The final image is ....
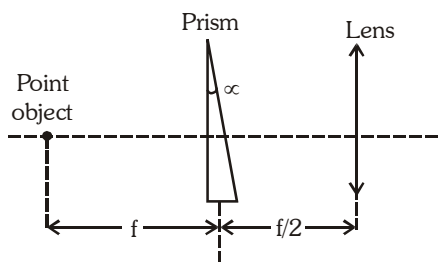
(1) virtual and formed at a distance 2f from the lens.

(2) real and formed at a distance 2f from the lens.

(3) real and formed at a distance 3/2.

(4) real and formed at a distance 3f from the lens.

Ans. *(4)*

Sol. $\delta = (\mu - 1) A$

$\delta = (15 - 1) 2$

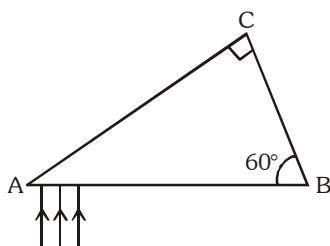$\delta = 1°$, deviation is very small object distance $u = \dfrac{3f}{2}$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \qquad \left[\because u = -\frac{3f}{2} \right]$$

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{3\dfrac{f}{2}}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{2}{3f} \Rightarrow \frac{1}{v} = \frac{1}{3f}$$

$\Rightarrow v = 3f$, Real image.

105. A narrow beam of light is incident on a 30° – 60° – 90° prism perpendicular to the surface AB. Assume that light beam is close to A. The index of refraction of prism is 2.1. See figure and take $\sin^{-1}\left(\dfrac{10}{21}\right) = 28°26'$. The beam emerges from the face.

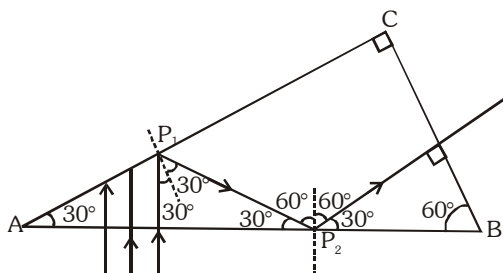(1) CB

(2) AB

(3) AC

(4) Some light through AC and remaining light through AB

Ans. *(1)*

Sol. Critical angle $c = \sin^{-1}\left(\dfrac{1}{n}\right)$

$c = 28° \, 26'$

At P_1 and P_2 total internal reflection takes place.

Light rays emerges from CB

106. A spherical iron ball is placed on a large block of dry ice at 0°C. The ball sinks into the ice until it is half submerged. Density of iron is $7.7 \times 10^3 \, kg/m^3$. Density of ice is $920 \, kg/m^3$. Specific heat capacity of iron is $504 \, J/kg$–K and latent heat of fusion of ice is $336 \times 10^3 \, J/kg$. The initial temperature of iron is

(1) $37.64 \,°C$
(2) $39.82 \,°C$
(3) $42.62 \,°C$
(4) $38.64 \,°C$

Ans. *(2)*

Sol. Heat loss by the hot body (iron ball) = Heat gain by the cold body (ice)
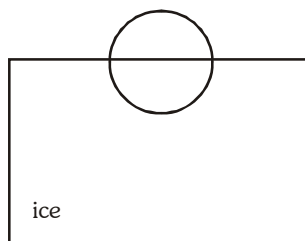
$m_B s_B (T - 0) = m_i L_f$

$V_B \rho_B s_B T = V_i \, \rho_i \, L_f$

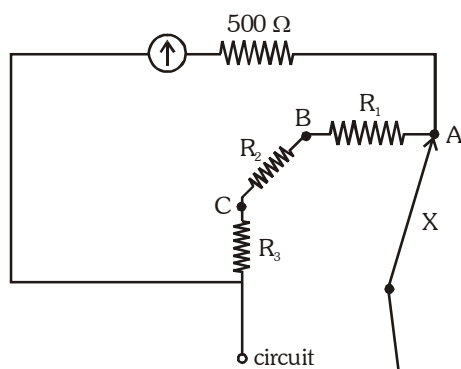$\left(\dfrac{4}{3} \pi r^3\right) \rho_B \cdot s_B \, T = \dfrac{1}{2}\left(\dfrac{4}{3} \pi r^3\right)\rho_i L_f$

ice

$T = \dfrac{\rho_i \, L_f}{2\rho_B s_B} = \dfrac{920 \times 336 \times 10^3}{2 \times 7.7 \times 10^3 \times 504}$

$T = 39.82 \,°C$

107. A galvanometer is used to measure small currents. A certain galvanometer has a resistance 500 Ω and gives a full-scale deflection for a current of 200 μA. This meter is connected as shown in the figure to make a multi range current meter.

Connection to the circuit is made at the terminals shown. The currents in the external circuit needed to give full scale deflections when X is connected to A, B and C in turn are shown in the table.

X connected to	Current in the external circuit (mA)
A	1
B	10
C	100

The value of R_3 is ....

(1) 2.25 Ω   (2) 0.25 Ω   (3) 1.25 Ω   (4) 3.25 Ω

Ans. *(3)*

Sol. Kirchoff's Law
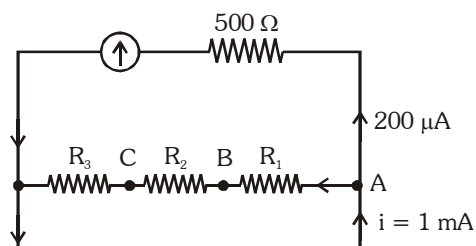
$500 \times 200 \ \mu A = (R_1 + R_2 + R_3) \ i_1$

$500 \times 200 \times 10^{-6} \ A = (R_1 + R_2 + R_3) \ [1 \ mA - 200 \ \mu A]$

$R_1 + R_2 + R_3 = \dfrac{500 \times 200 \times 10^{-6}}{10^{-6}[1000 - 200]}$

$R_1 + R_2 + R_3 = 125$ .... (1)

Now
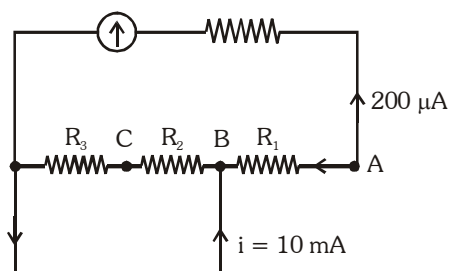
$\Rightarrow \ (500 + R_1) \ 200 \ \mu A = (R_2 + R_3) \ [10 \ mA - 200 \ \mu A]$

$(500 + R_1) \ 200 \times 10^{-6} = (R_2 + R_3) \ 10^{-6} \ [10000 - 200]$

$500 + R_1 = 49 \ (R_2 + R_3)$ .... (2)

Now

$(R_1 + R_2 + 500) \times 200\ \mu A = R_3\ [100\ mA - 20\ \mu A]$

$R_1 + R_2 + 500 = R_3\ [499]$ .... (3)

from (1) and (3)

$R_1 + R_2 + R_3 = 125$

$499\ R_3 - 500 + R_3 = 125$

$500\ R_3 = 625$

$R_3 = 1.25\ \Omega$

108. Light rays from a very small object immersed in water falls on the bubble of radius R. Assume that the object is very cl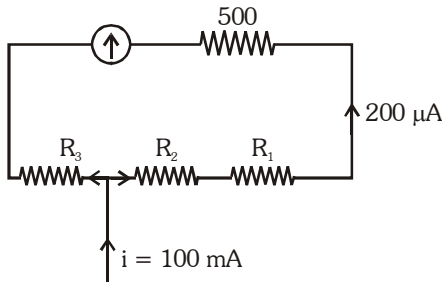ose to the surface of the bubble. Refractive index of water is 4/3. Take the approximation $\sin\theta = \theta$ and $\cos\theta = 1$ where 'θ' is angle and consider the rays close to a diameter of the bubble. Use the following formula to solve the

problem. $\dfrac{\sin\alpha}{a} = \dfrac{\sin\beta}{b} = \dfrac{\sin\gamma}{c}$ see figure.
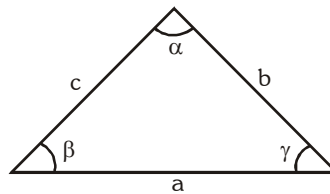
The image is .... (from the center of the bubble)
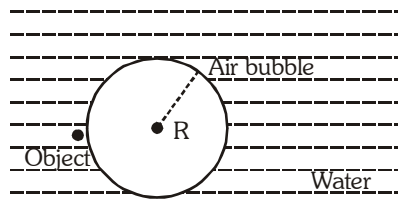
(1) Virtual and formed at a distance 3R/2.

(2) Virtual and formed at a distance 2R/3.

(3) Virtual and formed at a distance 3R/5.

(4) Real and formed at a distance 3R/2.

Ans. *(2)*

Sol. For first refraction

$$\frac{1}{v} - \frac{4/3}{u} = \frac{1 - 4/3}{R}$$ .... (1)

For second refraction

$$\frac{4/3}{v'} - \frac{1}{v} = \frac{4/3 - 1}{-R}$$ .... (2)

Adding (1) and (2)

$$\frac{4}{3}\left[\frac{1}{u} - \frac{1}{v'}\right] = -\frac{2 \times 1}{3R}$$

$$\frac{1}{u} - \frac{1}{v'} = -\frac{3}{2R}$$

Since u is very small

$$-\frac{1}{v'} = -\frac{3}{2R} \Rightarrow v' = \frac{2R}{3}$$

Image is at a distance $\frac{2R}{3}$, virtual
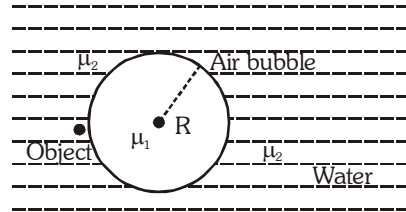
109. At what height above the earth's surface is the acceleration due to gravity 1% less than its value at the surface. Radius of earth is 6400 km.

Take $(1 + x)^{-2} = 1 - 2x$ when $x << 1$

(1) 16 km   (2) 32 km   (3) 64 km   (4) $32\sqrt{2}$ km

Ans. *(2)*

Sol. $g_h = g\left(1 - \frac{2h}{R}\right)$ .... (1)

$g_h = 0.99\,g$ .... (2)

Solving equation (1) and (2)

$$h = \frac{R}{200} = \frac{6400}{200} = 32\,\text{km}$$

110. An ant runs from an ant-hill in a straight line so that its velocity is inversely proportional to the distance from the center of ant-hill. When the ant is at a point A at a distance 1m from the center of the hill, its velocity is 2 cm/s. Point B is at a distance of 2m from the center of the ant-hill. The time taken by the ant to run from A to B is.

(1) 25 s   (2) 75 s   (3) 55 s   (4) 65 s

Ans. *(2)*

Sol. $v \propto \frac{1}{x}, v = \frac{R}{x}$

When x = 1, v = 0.02 m/s

So, R = 0.02

$$\frac{dx}{dt} = \frac{R}{x} \Rightarrow \int_1^2 x = dx = \int_0^T R\,dt$$

$$\left[\frac{x^2}{2}\right]_1^2 = \frac{2}{100}T$$

T = 758

111. The two ends of a horizontal conducting rod of length ℓ are joined to a voltmeter. The whole arrangement moves with a horizontal velocity v, the direction of motion being perpendicular to the rod. The vertical component of Earth's magnetic field is B. The voltmeter reading is.

(1) B/v only if the rod moves eastward.　　　　　(2) B/v only if the rod moves westward.

(3) B/v only if the rod moves in any direction.　　(4) zero

Ans. *(3)*

Sol. $E = \dfrac{-d}{dt}$

So, $E = \dfrac{d}{dt}$ (BA)

$E = \dfrac{BdA}{dt} = B\ell v$

$E = B\ell v$ only if the rod moves in any direction.
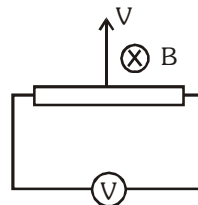
112. A ball of uniform density 2/3 of that of water is dropped freely into a pond from a height 10 m above its surface. The maximum depth the ball can travel in water is.

(1) 21 m　　　　　(2) 10 m　　　　　(3) 20 m　　　　　(4) 30 m

Ans. *(3)*

Sol. $F_B = V\rho g$

$= \dfrac{3}{d} \rho g$

$= \dfrac{3}{2} m\rho g$

As $\rho = 1$ gm/cm^3

$F_B = \dfrac{3}{2} mg$

Resultant force = $F_B - Mg = 3/2\ mg - mg = mg/2$ (upward)

$a = -g/2$, $u = \sqrt{2gh} \Rightarrow v^2 - u^2 = 2as$

$v = 0$, $s = 20$ m
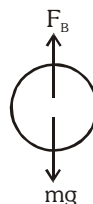
113. System is shown in figure. System is in equilibrium state. Assume that springs, threads and pulley are weightless. If the lower thread 'A' has been cut, immediately masses m_1, m_2, m_3 and m_4 get accelerations a_1, a_2, a_3 and a_4 respectively. Which of the following is True ?
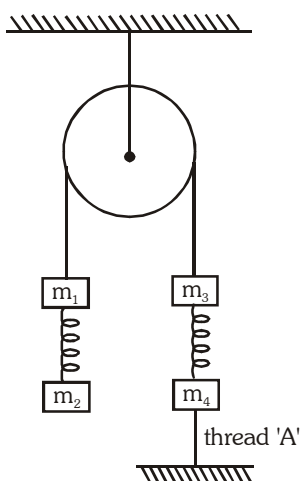
(1) $a_1 \neq 0$; $a_2 \neq 0$; $a_3 \neq 0$; $a_4 \neq 0$　　　　(2) $a_1 = a_2 = a_3 = 0$; $a_4 \neq 0$

(3) $a_1 = a_2 = 0$; $a_3 \neq 0$; $a_4 \neq 0$　　　　　　　(4) $a_2 \neq 0$; $a_1 \neq 0$; $a_3 = 0$; $a_4 \neq 0$

Ans. *(1)*

Sol. As tension in thread A becomes zero all the masses fall under gravity so

$a_1 \neq 0$, $a_2 \neq 0$, $a_3 \neq 0$, $a_4 \neq 0$

114. Chemical testes of four metals A, B, C, D show the following results :

- Only B and C react with 0.5 M HCl to give H_2 gas.
- When B is added to a solution containing the ions of the other metals, metallic A, C and D are formed.
- A reacts with 6 M HNO_3, but D does not

Arrange the metals in the increasing order as reducing agents.

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

Ans. *(4)*

Sol. HNO_3 is highly oxidizing agent. If A metal can react that means it is very reactive A > D.

Metal B can replace A, C, and D. It means it is more reactive than A, C, D. B > A, C, D.

Only B and C can react it mean they are more reactive than both A and D,

Correct reactivity order of reducing agents D < A < C < B.

115. Classify each of the following reactions :

(a) $Zn_{(s)} + 2AgNO_{3(aq)} \rightarrow Zn(NO_3)_{2(aq)} + 2Ag_{(s)}$

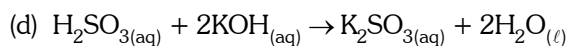(b) $Ca(OH)_{2(s)} \xrightarrow{\text{Heating}} CaO_{(s)} + H_2O_{(g)}$

(c) $Cu(NO_3)_{2(aq)} + Na_2S_{(aq)} \rightarrow CuS_{(aq)} + 2\,NaNO_{3(aq)}$

(d) $H_2SO_{3(aq)} + 2KOH_{(aq)} \rightarrow K_2SO_{3(aq)} + 2H_2O_{(\ell)}$
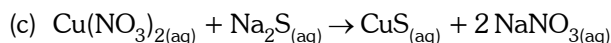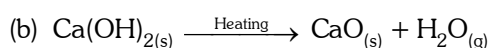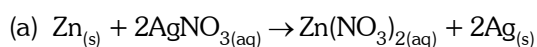
	Reaction/Type of reaction			
	(a)	(b)	(c)	(d)
(1)	Precipitation	Neutralization	Decomposition	Redox reaction
(2)	Neutralization	Precipitation	Redox reaction	Decomposition
(3)	Redox reaction	Decomposition	Precipitation	Neutralization
(4)	Decomposition	Redox reaction	Neutralization	Precipitation

Ans. *(3)*

Sol. (a)
$$\overset{0}{Zn}(s) + 2\overset{+1}{Ag}NO_3(aq) \rightarrow \overset{+2}{Zn}(NO_3)_2(aq) + 2\overset{0}{Ag}(s)$$

Redox reaction
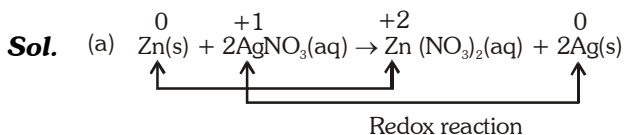
(b) In presence of heat $Ca(OH)_2$ is decomposing into $CaO + H_2O$.

(c) In this example CuS(s) precipitate is formed.

(d) Acid and Base gives neutralization reaction.

116. Consider the following pairs of elements :

I and H , C and F, Ba and F, N and F, K and O

The correct statement regarding these pairs is :

(1) The two pairs Ba and F, K and O most likely to form Ionic bonds

(2) The least polar bond is formed between C and F

(3) Between I and H an ionic bond is formed

(4) Between N and F the covalent bond is most polar

Ans. *(1)*

Sol. Ba & K are metals whereas F & O are non-metal form ionic bond between them.

117. "We have to get the problem of acid rain under control. We must do whatever it takes to get the pH down to zero". The quote is.

(1) absolutely correct

(2) wrong

(3) meaningless becuase pH of rain water has no relation with its acidic nature

(4) quite meaningful

Ans. *(2)*

Sol. pH = 0 is most acidic but in controlling the problem of acid rain pH = 0 can not be a right quote.

118. Match the following :

Compond formula	Class of the compound
(a) C_2H_4	(i) Alkane
(b) C_7H_{12}	(ii) Alkene
(c) $C_{13}H_{28}$	(iii) Alkyne
(d) C_5H_{10}	(iv) Possible cyclo alkane

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

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

Ans. *(2)*

Sol. General formula of

Alkane-C_nH_{2n+2}

Alkene-C_nH_{2n}

Alkyne-C_nH_{2n-2}

But possible cyclo alkane $\Rightarrow C_nH_{2n}$ [more than 2C].

119. Which of the following class of organic compound does not contain (C = O) group in some form ?

(1) Aldehydes   (2) Ethers   (3) Carboxylic acids   (4) Esters

Ans. *(2)*

Sol. Ethers have R – O – R formula

does not contain [C = O]

120. Sodium azide NaN_3 decomposes explosively to sodium metal and nitrogen gas and is used in automobile air bags.

$2NaN_3 \rightarrow 2Na + 2N_2$
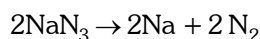
Azide ion is iso electronic to ....

(1) CO   (2) NO   (3) CO_2 (4) H_2O

Ans. *(3)*

Sol. Azide ion = N_3^- number of electrons $21 + 1 \Rightarrow 22$

CO_2 has 22 electrons so it is isoelectronic with N_3^-

$C \Rightarrow 6$ electrons.

$O \Rightarrow 8$ electrons.

$2O \Rightarrow 16$ electrons.

Total number of electrons = 22

121. The path of light gets illuminated when passed through the solution –

(1) Blood solution$_{(aq)}$ (2) Brine solution$_{(aq)}$

(3) Copper sulphate solution$_{(aq)}$ (4) Acetic acid solution$_{(aq)}$

Ans. *(1)*

Sol. Blood is a colloidal solution. It can scatter the light and path of light becomes visible.

122. Which one of the following is the smallest in size ?

(1) N^{3-} (2) O^{2-} (3) F^{-1} (4) Na^+

Ans. *(4)*

Sol. In case of isoelectonic species.

Radius of cation $\propto \dfrac{1}{Z}$

Radius of anion $\propto Z$

$Z \Rightarrow$ charge on species.

123. The action of cleaning of oily dirt by soap is based on ....

(1) solubility in water

(2) hydrophilic property

(3) hydrophobic property

(4) presence of both hydrophilic and hydrophobic groups

Ans. *(4)*

Sol. Soap contains both hydrophilic and hydrophobic ends

for *e.g.* $\underbrace{C_{17}H_{35}}_{Hydrophobic}\ \underbrace{COO^-Na^+}_{Hydrophilic}$ so they can easily form micelles which helps in cleaning action.

Soap

124. Graphite is very soft as compared to other substances because.

(1) carbon atoms are arranged in hexagonal structure

(2) carbon atoms are arranged in such a way that they form flat layers

(3) linkages between atoms within a layer of graphite are week

(4) linkages between atoms of two layers are weak

Ans. *(4)*

Sol. Graphite has weak vanderwaal's forces between two layers.

125. The gaseous hydrocarbon acetylene, C_2H_2 used in welder's torches, releases 1300 kJ. When 1 mole of C_2H_2 undergoes combustion, then which of the following is not TRUE ?

(1) Combustion of acetylene is an exothermic reaction

(2) The balanced chemical reaction of combustion of acetylene is : $C_2H_2 + 5O_2 \rightarrow 2CO_2 + H_2O$

(3) 2 moles of water produced when 2 moles of acetylene reacts.

(4) 44 g of CO_2 produced when 13 g of acetylene reacts.

Ans. *(2)*

Sol. A complete balanced reaction of combustion of acetylene is

$C_2H_2 + 5/2\ O_2 \rightarrow 2CO_2 + H_2O$
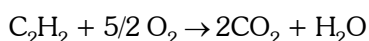
126. You have the mythical metal element 'X' that can exhibit variable valences 1, 2 and 5. Which of the following is/are not the correct chemical formula/formulae for the compounds formed by the combination of the "X" ions with different radicals ?

(A) XPO_4 (B) X_2SO_4 (C) X_5ClO_4 (D) X_3NO_3

(1) Only B   (2) B and C   (3) A, C and D   (4) B and D

Ans. *(3)*

Sol. In XPO_4, X_5ClO_4, X_3NO_3, valencies of X, $-ClO_4^{-1}$ & $-NO_3^{-1}$ are wrong.

127. Your friend is unable to identify the colours of flowers. What would be the reason ?

(A) Malfunctioning of rods   (B) Malfunctioning of cones

(C) Haemophilia   (D) Colour blindness

Choose the correct answer :

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

Ans. *(4)*

Sol. Cones are photoreceptor cells present in Retina and are of three types blue, green and red and give colour vision. Colour blindness is the decreased ability to see colour or differences in colour. It is a genetic disease. In both the cases *i.e.* colour blindness and malfunctioning of cones the person will not be able to identify colours of flowers.

128. Bioluminescence is a feature exhibited by animals of ....

(1) Abyssal zone   (2) Euphotic zone   (3) Bathyal zone   (4) Photic zone

Ans. *(1)*

Sol. The abyssal zone is the deepest layer of the ocean near the sea floor. Many organisms living here like deep sea anglerfish use bioluminescence to attract prey and navigate in darkness.

129. Match the items in Group-1 with Group- 2.

Group-1	Group-2
(A) Instinct	(i) Doucklings
(B) Imprinting	(ii) Pavlov
(C) Imitation	(iii) Reflexes
(D) Conditioning	(iv) Monkey and hat merchant

Choose the correct answer :

(1) A-iv, B-i, C-iii, D-ii   (2) A-iii, B-i, C-iv, D-ii   (3) A-iii, B-iv, C-i, D-ii   (4) A-ii, B-i, C-iv, D-iii

Ans. *(2)*

Sol. An example of imprinting is ducklings following their mother. An example of imitation is monkey and hat merchant. Pavlov was the person who worked on classical conditioning.

130. In muscular tissues contractile proteins play a role in

(1) Osmosis and diffusion   (2) Contraction and relaxation

(3) Transpiration and transportation   (4) Excretion and secretion

Ans. *(2)*

Sol. Contractile proteins like Actin and Myosin in muscular tissues play a role in contraction and relaxation of muscles.

131. At the end of the experiment to prove that light is necessary for photosynthesis, when the leaf was tested with iodine, the 'S' shaped figure on the leaf was found to be.
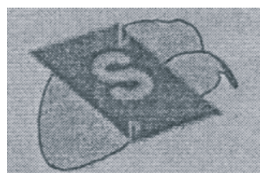
(1) green-presence of starch   (2) blue-black presence of starch

(3) green-absence of starch   (4) blue-black absence of starch

Ans. *(2)*

Sol. The 'S' shaped figure on the leaf will turn blue black due to presence of starch as the S shaped figure is uncovered and will receive light and will be able to photosynthesize food which is stored as starch, which when tested with iodine gives blue black colour.

132. One boy is not able to see in the night. Which kind of vitamins you suggest him to take ?

(1) Calciferol (2) Tocoferol (3) Retinol (4) Riboflavin

Ans. *(3)*

Sol. Night blindness is caused by deficiency of Vitamin A. Thus he should take retinol one of the animal forms of vitamin A.

133. Which of the following statements are true about respiration ?

(i) Hemoglobin has greater affinity for CO_2 than O_2.

(ii) The gaseous exchange takes place in the alveoli.

(iii) During inhalation ribs move inward and diaphragm is raised

(iv) Hemoglobin has greater affinity for O_2 than CO_2.

Choose the correct answer :

(1) (ii) and (iv) (2) (i) and (iii) (3) (ii) and (iii) (4) (i) and (ii)

Ans. *(1)*

Sol. The gaseous exchange takes place in the alveoli in lungs. Haemoglobin has greater affinity for O_2 than CO_2 which allows gas exchange to occur in lungs.

134. 'Edema' is related to ....

(1) Digestive system (2) Excretory system (3) Lymphatic system (4) Arterial system

Ans. *(3)*

Sol. Edema is related to lymphatic system. Edema is an abnormal accumulation of fluid in the interstitium, located beneath the skin and in the cavities of the body, which can cause severe pain.

135. Some organs of man have their own specific functions but carry out excretion as a secondary function. Identify them.

(1) Lungs, Kidney, Nephron   (2) Liver, Skin, Lungs

(3) Skin, Kidney, Intestine   (4) Intestine, Liver, Kidney

Ans. *(2)*

Sol. Liver, skin and lungs are accessory excretory organs.

136. If you keep a ripened fruit in the midst of a basket of raw fruits, all the fruits get ripened in short period. Because of

(1) Auxin produced by ripened fruits.

(2) Abscisic acid produced by ripened fruits.

(3) Ethylene produced by ripened fruits.

(4) Gibberellins produced by ripened fruits.

Ans. *(3)*

Sol. Ethylene is a gaseous plant hormone which causes ripening of fruits.

137. How many ovules might have been fertilized to produce 100 seeds in a water melon ?

(1) 25 (2) 50 (3) 100 (4) 125

Ans. *(3)*

Sol. 100 ovules have to be fertilized to produce 100 seeds.

138. A rose plant obtained from self cross of heterozygous red has produced 200 flowers. How many of them would be heterozygous red flowers ?

(1) 25 (2) 50 (3) 100 (4) 150

Ans. *(3)*

Sol. Rr × Rr

  ↓

RR Rr Rr rr

200 flowers have been produced by self cross of heterozygous red flowers. Half of the flowers produced will be heterzygous red flowers i.e. 100 as shown by the cross above.

139. What will happen if snake is missing in the food chain given below ?

Grains $\rightarrow$ Rat $\rightarrow$ Snake $\rightarrow$ Eagle

(1) Total quantity of grains may increase

(2) Population of eagles may increase

(3) Eagle starts to eat grains

(4) Populaton of rats may increase

Ans. *(4)*

Sol. If snake is missing in the food chain number of rats will increase as there will not be any predator to feed on them.

140. Which of the following practices are suitable to farmer with less water resources ?

(A) Select a short term crop

(B) Cultivate commercial crops

(C) Adopt drip irrigation system

(D) Crop holiday

Choose the correct answer :

(1) A and C   (2) A, B and C   (3) A and D   (4) C and D

Ans. *(1)*

Sol. A short term crop should be grown and drip irrigation system should be used which will help to conserve water.

141. If $x + 3y - z = 4$, $3x + 3y + z = 12$, $(x+3y)^2 - z^2 = 36$, then the value of $x =$ _____

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

Ans. *(1)*

Sol. Given equation

$x + 3y - z = 4$ ....(1)

$3x + 3y + z = 12$ ....(2)

$(x + 3y)^2 - z^2 = 36$ ....(3)

From equation (1) & (2)

$\begin{aligned} x + 3y - z &= 4 \\ 3x + 3y + z &= 12 \\ \hline 4x + 6y &= 4 \\ 2x + 3y &= 8 \end{aligned}$

From equation (1) $z = x + 3y - 4$

From equation (3)

$(x + 8 - 2x)^2 - (x + 8 - 2x - 4)^2 = 36$

$(8 - x)^2 - (4 - x)^2 = 36$

$64 + x^2 - 16x - (16 + x^2 - 8x) = 36$

$64 + \cancel{x^2} - 16x - 16 - \cancel{x^2} + 8x = 36$

$48 - 8x = 36$

$12 = 8x$

$x = \dfrac{3}{2}$

142. If the roots of quadratic equation $x^2 + px + q = 0$ are Tan 30° and Tan 15° respectively, then the value of $2 + q - p =$

(1) 3   (2) 4   (3) – 1   (4) – 2

Ans. *(1)*

Sol. Tan 30° = $\dfrac{1}{\sqrt{3}}$

tan 15° = tan (60° – 45°) = $\dfrac{\sqrt{3}-1}{1+\sqrt{3}}$ = $2-\sqrt{3}$

Given equation $x^2 + px + q = 0$

than 30° + tan 15° = – p

$\dfrac{1}{\sqrt{3}} + 2 - \sqrt{3} = -p$

$\dfrac{2\sqrt{3}-2}{\sqrt{3}} = -p$

tan 30° tan 15° = q

$\dfrac{1}{\sqrt{3}} (2 - \sqrt{3}) = q$

$2 + q - p = 2 + \dfrac{2-\sqrt{3}}{\sqrt{3}} + \dfrac{2\sqrt{3}-2}{\sqrt{3}}$

$= \dfrac{2\sqrt{3} + \cancel{2} - \sqrt{3} + 2\sqrt{3} - \cancel{2}}{\sqrt{3}}$

$= \dfrac{3\sqrt{3}}{\sqrt{3}} = 3$

143. If 30, 72 and x are three integers, such that the product of any two of them is divisible by the third, then the least value of x is _____.

(1) 45   (2) 60   (3) 48   (4) 24

Ans. *(2)*

Sol. Since product of any two to them in divisble by third.

$\dfrac{30 \times 72}{x} = \dfrac{2 \times 5 \times 3 \times 2 \times 2 \times 2 \times 3 \times 3}{x}$

$\dfrac{30 \times x}{72} = \dfrac{2 \times 3 \times 5 \times x}{2 \times 2 \times 2 \times 3 \times 3}$
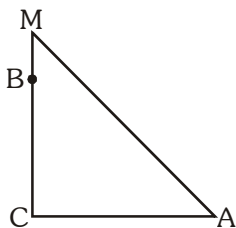
$\Rightarrow$ x must have 2 × 2 × 3

$\dfrac{72 \times x}{30} = \dfrac{2 \times 2 \times 2 \times 3 \times 3 \times x}{2 \times 3 \times 5}$

x must contain 5

$\Rightarrow$ Least value of x = 2 × 2 × 3 × 5

$= 60$

144. In the right triangle shown MB + MA = BC + AC. If BC = 8 and AC = 10, then the value of MB = _____.

(1) $\dfrac{27}{5}$
(2) $\dfrac{15}{7}$
(3) $\dfrac{40}{13}$
(4) 6

Ans. *(3)*

Sol. Given

MB + MA = BC + AC = 18

Let MB = x

MA = 18 – x

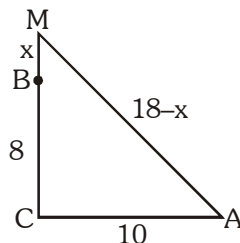In ΔMCA

$(18 - x)^2 = (x + 8)^2 + 10^2$

$324 + x^2 - 36x = x^2 + 64 + 16x + 100$

$52x = 160$

$x = \dfrac{160}{52} = \dfrac{40}{13} = MB$

145. Let a, b and c be real numbers, such that a – 7b + 8c = 4 and 8a + 4b – c = 7, then the value of $a^2 - b^2 + c^2$ = _____.

(1) –1
(2) 4
(3) –2
(4) 1

Ans. *(4)*

Sol. Given equation

a – 7b + 8c = 4 ....(1)

8a + 4b – c = 7 ....(2)

From (1) & (2)

$a = \dfrac{13 - 5c}{12}, b = \dfrac{13c - 5}{12}$

Now, $a^2 - b^2 + c^2 = \left(\dfrac{13 - 5c}{12}\right)^2 - \left(\dfrac{13c - 5}{12}\right)^2 + c^2$

= 1

146. The roots of $x^3 + 3x^2 + 4x - 11 = 0$ are a, b and c and that the roots of $x^3 + r x^2 + sx + t = 0$ are a + b, b + c and c + a, then the value of t = _____

(1) 18
(2) 23
(3) 15
(4) –17

Ans. *(2)*

Sol. Given equation $x^3 + 3x^2 + 4x - 11 = 0$ ....(1)

a + b + c = – 3

ab + bc + ca = 4

abc = 11

$x^3 + rx^2 + sx + t = 0$ ....(2)

(a + b) (b + c) (c + a) = – t

(– 3 – c) (– 3 – a) (– 3 – b) = – t   [∵ a + b + c = – 3]

(3 + c) (3 + a) (3 + b) = t

(9 + 3a + 3c + ac) (3 + b) = t

(27 + 9b + 9a + 3ab + 9c + 3bc + 3ac + abc) = t

27 + 9(a+b+c) + 3(ab + bc + ca) + abc = t

27 – 27 + 12 + 11 = t

t = 23

147. If $a < b < c < d < e$ are consecutive positive integers, such that $b + c + d$ is a perfect square and $a + b + c + d + e$ is a perfect cube. What is the smallest possible value of c ?

(1) 675   (2) 576   (3) 475   (4) 384

Ans. *(1)*

Sol. $a < b < c < d < e$

Let $b = a + 1\ c = a + 2, d = a + 3, e = a + 4$

$b + c + d = a + 1 + a + 2 + a + 3$

$= 3a + 6$

$= 3(a + 2)$

$a + b + c + d + e = a + a + 1 + 2 + a + 3 + a + 4$

$= 5a + 10$

$= 5 (a + 2)$

Now $3(a + 2)$ must be perfect square

and $5 (a + 2)$ must be perfect cube

$\Rightarrow a + 2 = 5 \times 5 \times 3 \times 3 \times 3$

$= 675$

148. Product of two roots $x^4 - 11x^3 + kx^2 + 269x - 2001$ is -69, then the value of $k = \ldots\ldots$

(1) 5   (2) -7 (3) -10 (4) 8

Ans. *(3)*

Sol. $x^4 - 11x^3 + kx^2 + 269x - 2001$

Let the roots of given equation be a,b, c and d,

$a + b + c + d = 11$ ....(1)

$ac + bd + ab + bc + cd + da = k$ ....(2)

$abc + bcd + cda + dab = -269$ ....(3)

$abcd = 2001$ ....(4)

Given $ab = -69$ ....(5)

$\Rightarrow cd = 29$ ....(6)

From (4)

$-69c + 29b + 29a - 69d = -269$

$-69 (c + d) + 29 (b + a) = -269$ ....(7)

on solving (1) & (7)

$c + d = 6, a + b = 5$

From (2)

$-69 + 29 + ad + bc + ac + bd = k$

$-40 + d (a + b) + c (a + b) = k$

$-40 + (a + b) (c + d) = k$

$-40 + 5 \times 6 = k$

$-40 + 30 = k$

$k = -10$

149. In triangle ABC, AC = 3AB, let AD bisect angle A with D lying on BC and let E be the foot of the perpendicular from C to AD. Then $\dfrac{\text{area of } \triangle ABD}{\text{area of } \triangle CDE} =$

(1) 2   (2) $\dfrac{1}{3}$ (3) $\dfrac{1}{4}$ (4) $\dfrac{2}{3}$

Ans. *(2)*

Sol. ABC is a $\triangle$ with AC = 3AB

Let AB = x , AC= 3x

In $\triangle$ABC, AD is angle bisector

$\dfrac{AB}{AC} = \dfrac{BD}{DC}$

$\dfrac{1}{3} = \dfrac{BD}{DC}$

In $\triangle$AFC, AE is angle bisector

$\dfrac{AF}{AC} = \dfrac{FE}{EC}$

$\dfrac{AF}{AC} = 1$

AF = AC

AF = 3x

BF = 2x

In $\triangle$ABC

$\dfrac{x}{2x} \times \dfrac{z}{z} \times \dfrac{q}{p} = 1$

$\dfrac{q}{p} = \dfrac{2}{1}$

$\dfrac{ar(\triangle FGC)}{ar(\triangle AFG)} = \dfrac{2}{1}$, $\dfrac{ar(\triangle DCG)}{ar(\triangle DAG)} = \dfrac{2}{1}$

$\dfrac{ar(\triangle FGC) - ar(\triangle DCG)}{ar(\triangle AFG) - ar(\triangle DAG)} = \dfrac{2}{1}$

$\dfrac{ar(\triangle DFC)}{ar(\triangle ADF)} = \dfrac{2}{1}$

ar ($\triangle$DFC) = 2p, ar ($\triangle$ADF) = p

ar ($\triangle$ABD) = $\dfrac{1}{3}$p , ar ($\triangle$CDE) = $\dfrac{1}{2}$2p = p

$\dfrac{ar(\triangle ABD)}{ar(\triangle CDE)} = \dfrac{1}{3}$
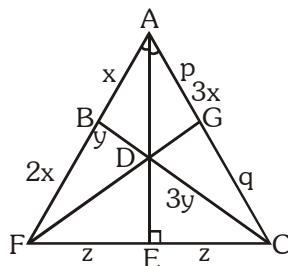
150. 3 sides of triangle are consecutive integers and the largest angle is twice the smallest angle. The perimeter of triangle is_____.

(1) 15 units   (2) 10 units   (3) 12 units   (4) 16 units

Ans. *(1)*

Sol. Le sides of triangle be $a-1$, a, $a+1$

$\angle B = 2\angle C$

$\sin B = \sin 2C$

$\sin B = 2\sin C \cos C$

$\dfrac{b}{2R} = 2\cos C \dfrac{c}{2R}$

$\cos C = \dfrac{b}{2c}$

$\dfrac{b^2 + a^2 - c^2}{2ab} = \dfrac{2}{2c}$

$\dfrac{(a+1)^2 + a^2 - (a-1)^2}{a(a+1)} = \dfrac{(a+1)}{a-1}$

$\dfrac{a^2 + \cancel{1} + 2a + \cancel{a^2} - \cancel{a^2} - \cancel{1} + 2a}{a^2 + a} = \dfrac{a+1}{a-1}$

$\dfrac{a^2 + 4a}{a^2 + a} = \dfrac{a+1}{a-1}$

$(a^2 + 4a)(a-1) = (a^2 + a)(a+1)$

$\cancel{a^3} - a^2 + 4a^2 - 4a = \cancel{a^3} + a^2 + a^2 + a$

$a^2 - 5a = 0$

$a = 5$

sides are 4, 5, 6

perimeter = 15
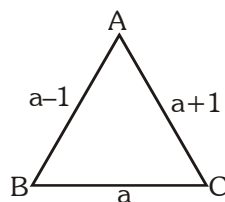
151. In a triangle ABC, D is the mid point of AB, E is the mid point of DB and F is the mid point of BC. If the area of $\triangle ABC$ is 96, then the area of $\triangle AEF$ is _____.

(1) 16   (2) 24   (3) 32   (4) 36

Ans. *(4)*

Sol. ar($\triangle ABC$) = 96

In $\triangle ABC$, AF is median

ar ($\triangle ABF$) = $\dfrac{1}{2} \times 96$

= 48

In $\triangle BFD$, FD is median

ar ($\triangle ADF$) = $\dfrac{1}{2} \times 48$ = 24 = ar ($\triangle BFD$)

In $\triangle ABF$, FE is median

ar($\triangle DEF$) = $\dfrac{1}{2} \times 24$ = 12

ar($\triangle AEF$) = 24 + 12 = 36
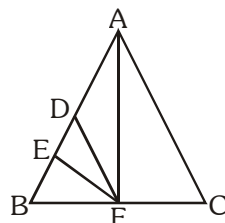
152. In the quadrilateral ABCD, $\underline{A} = \underline{C} = 90°$ AE - 5 cm, BE = 12 cm and AC = 21 cm. If DF = x, then the value of x = _____.
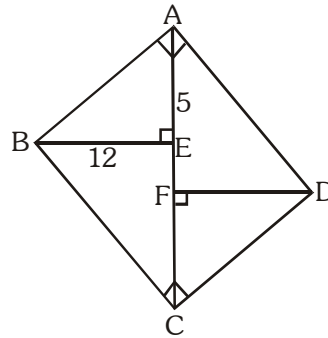
(1) $4\dfrac{3}{5}$ cm   (2) $5\dfrac{1}{4}$ cm   (3) $6\dfrac{2}{3}$ cm   (4) 7 cm

Ans. *(3)*

Sol. In ΔAEB and AFD

$\angle B = \angle F$

$\angle BAE = \angle ADF$

$\Delta AEB \sim \Delta DFA$

$\dfrac{AE}{DE} = \dfrac{EB}{FA}$

$\dfrac{5}{x} = \dfrac{12}{y+5}$

$5y + 25 = 12x$ ....(1)

In Δ BEC and DFC

$\angle E = \angle F$

$\angle B = \angle FCD$

$\Delta EBC \sim \Delta FCD$

$\dfrac{EB}{FC} = \dfrac{EC}{FD}$

$\dfrac{12}{16-y} = \dfrac{16}{x}$

$12x = 256 - 16y$ ....(2)

From (1) & (2)

$5y + 25 = 256 - 16y$

$21y = 231$

$y = 11$

From (1)

$12x = 55 + 25$

$12x = 80$

$x = \dfrac{80}{12} = \dfrac{20}{3} = 6\dfrac{2}{3}$ cm
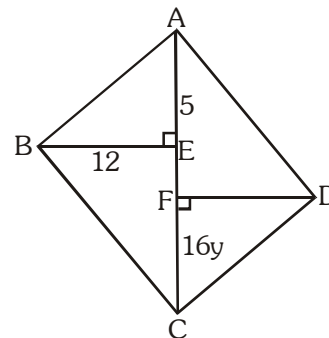
153. In the figure 'O' is the in center of $\triangle ABC$ where AB = 3 cm, BC = 4 cm and AC = 5 cm. Area of $\triangle ABC$ = rs, where r is in radius and s is the semiperimeter, then the value of OC = _____.

A

5cm   3cm

•O

C   4cm   B
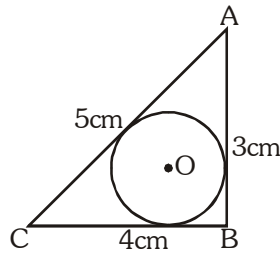
(1) $\sqrt{10}$ cm   (2) 8 cm   (3) $\sqrt{5}$ cm   (4) $2\sqrt{2}$ cm

Ans. *(1)*

Sol. Let BQ = x

BP = BQ

AQ = AR

CR = CP

Since BP = BQ = x

QA = 3 – x = AR

CP = 4 – x = CR

Now,

CR + AR = 5cm

4 – x + 3 – x = 5cm

4 – x + 3 – x = 5

7 – 2x = 5

2 = 2x

x = 1

$\Rightarrow$ OP = 1 cm

CP = 4 – 1 = 3cm

In $\triangle$OCP

$OC^2 = OP^2 + CP^2$

$OC = \sqrt{1^2 + 3^2}$

$= \sqrt{10}$ cm

A

3–x   3–x

5cm R   3cm

4+x   O   Q

C   4cm P   B   x
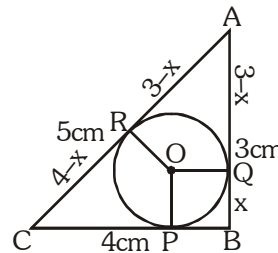
154. If $p(x) = x^4 + ax^3 + bx^2 + cx + d$ and p(1) = p(2) = p(3) = 0, then the value of p(4) + p(0) = _____

(1) 10   (2) 24   (3) 25   (4) 12

Ans. *(2)*

Sol. $p(x) = x^4 + ax^3 + bx^2 + cx + d$

$\because$ p(1) = p(2) = p(3) = 0

$\Rightarrow$ p(x) = (x – 1) (x – 2) (x – 3) (x – p)

p(4) + p(0) = 3.2.1. (4 – p) + (– 1) (– 2) (– 3) (– p)

= 24 – 6p + 6p

= 24

155. In the adjoining figure ABC is a triangle, P is an interior point in it. Three lines are drawn through the point P, parallel to three sides as shown in the figure. The triangle is divided into six parts. The areas as 3 smaller triangles are 4, 9 and 16 units, then the area of ΔABC is _____.
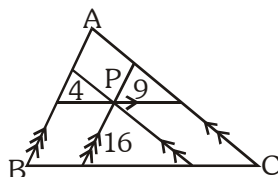
(1) 64   (2) 81   (3) 42   (4) 65

Ans. *(2)*

Sol. In ΔDUP and PFG

$$\angle U = \angle F$$

$$\angle D = \angle FPG$$

$$\Delta UDP \sim \Delta FPG$$

$$\frac{UP}{FG} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{BF}{FG} = \frac{1}{2}$$

$$\frac{ar(\Delta PBF)}{ar(\Delta PFG)} = \frac{1}{2}$$

$$\frac{ar(\Delta PBF)}{16} = \frac{1}{2}$$

$$ar(\Delta PBF) = 8 = ar(\Delta PUB)$$

$$\Delta EPV \sim \Delta PFG$$

$$\frac{PV}{FG} = \frac{3}{4} = \frac{GC}{FG}$$

$$ar(\Delta PGC) = ar(\Delta PVC) = 12$$

$$ar(\Delta UDP) \sim ar(\Delta PEV)$$

$$\frac{UD}{PE} = \frac{2}{3} = \frac{UD}{AD}$$

$$ar(\Delta ADP) = ar(\Delta APE) = 6$$

$$ar(\Delta ABC) = 81$$
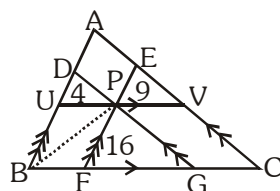
156. In the figure, O is the center of the circle CAB is a secant, CO = 41 cm, CA = 28 cm and OB = 15 cm. OE ⊥ AB, then AE = _____.
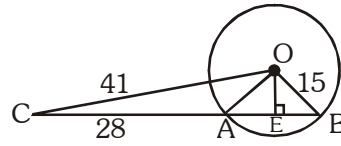
(1) 8 cm   (2) 10 cm   (3) 12 cm   (4) 15 cm

Ans. **(3)**

Sol. Let AB = x

$CT^2 = 28(28 + x)$

$41^2 - 15^2 = 28(28 + x)$

$\dfrac{(41+15)(41-15)}{28} = 28 + x$

$\dfrac{56 \times 26}{28} = 28 + x$

$52 - 28 = x$

$AE = \dfrac{x}{2} = 12 \text{cm}$
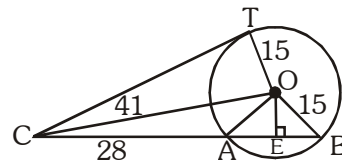
157. If Sin α and Cos α are the roots of $ax^2 + bx + c = 0$, then $a^2 + 2ac$ = _____.

(1) c^2 (2) $-2ab$ (3) b^2 (4) 0

Ans. **(3)**

Sol. $ax^2 + bx + c = 0$

$\text{Sin } \alpha + \text{Cos } \alpha = -\dfrac{b}{a}$

$\text{Sin } \alpha \cdot \text{Cos } \alpha = \dfrac{c}{a}$

$1 + \dfrac{2c}{a} = \dfrac{b^2}{a^2}$

$a^2 = b^2 - 2ac$

$a^2 + 2ac = b^2$

158. The area enclosed by the curve $|x| + |y| = 1$ is _____.

$$\begin{bmatrix} |x| & = x \text{ for} & x > 0 \\ & = -x \text{ for} & x < 0 \\ & = 0 \text{ for} & x = 0 \end{bmatrix}$$

(1) 1 square units   (2) 2 square units   (3) 3 square units   (4) 4 square units

Ans. *(2)*

Sol. Area = $4 \times \dfrac{1}{2} \times 1$
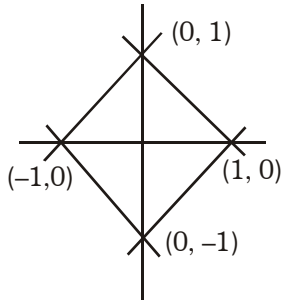
= 2 square units

159. $3^9 + 3^{12} + 3^{15} + 3^n$ is a perfect cube, $n \in N$, then the value of n = _____.

    (1) 18   (2) 17   (3) 14   (4) 16

Ans. *(3)*

Sol. $3^9 + 3^{12} + 3^{15} + 3^n$

    $3^9 (1 + 3^3 + 3^6 + 3^{n-9})$

    3^9 is perfect cube and for n = 14 $(1 + 3^3 + 3^6 + 3^5) = 1000$

    which is perfect cube

    Hence n = 14

160. A four digit number has the following properties :

    (i) It is a perfect square

    (ii) Its first two digits are equal to each other

    (iii) Its last two digits are equal to each other

    Then the four digit number is _____.

    (1) 5566   (2) 7744   (3) 2288   (4) 3399

Ans. *(2)*

Sol. Only 7744 is in option that satisfies above properties.

161. Who sought to build a cooperative community called New Harmony in Indiana (USA)?

    (1) Robert Owen   (2) Louis Blanc   (3) Friedrich Engels   (4) Karl Marx

Ans. *(1)*

Sol. Robert Owen sought to build a cooperative community called New Harmony in Indiana.

162. "One people, one empire, one leader", whose slogan is this?

   (1) Stalin   (2) Adolf Hitler   (3) Lenin   (4) Benito Mussolini

Ans. *(2)*

Sol. Adolf Hitler gave this slogan in Nazi Germany.

163. According to the 1878 Forest Act, even the villagers cannot take anything from these classified forests?

    (1) Village forests   (2) Protected forests   (3) Reserved forests   (4) All of these

Ans. *(3)*

Sol. Villagers could not take anything from Reserved forests.

164. Who argued that the state had not created the wind, water, earth and wool, so it could not own it ?

    (1) Surontiko Samin   (2) Dirk van Hogendorp   (3) Ho Chi Minh   (4) San Jose

Ans. *(1)*

Sol. Around 1890, Surontiko Samin of Randublatung village, a teak forest village, began questioning state ownership of the forest. He argued that the state had not created the wind, water, earth and wood, so it could not own it.

165. Find the CORRECT statement in relation with 'Bugyal' ?

(1) A dry forest area below the foothills of Garhwal and Kumaon.

(2) Lower ends of grain stalks left in the ground after harvesting

(3) Pastrol community of Maharashtra

(4) Vast meadows in high mountains

Ans. *(4)*

Sol. Bugyals are vast natural pastures on the high mountains, above 12,000 feet. They are under snow in the winter and come to life after April. Vast meadows in the high mountains.

166. Find out the WRONG statement.

(1) The head quarters of International Cricket Council is located in Dubai.

(2) Parsis founded the first Indian Cricket Club, the Oriental Cricket Club in Bombay in 1848

(3) The World's First Cricket Club was formed in Hambledon in 1760s.

(4) First One Day International Cricket Match was played in 1977.

Ans. *(4)*

Sol. 1971 was a landmark year because the first one-day international was played between England and Australia in Melbourne.

167. Who was called Mad Bonze by the French?

(1) Huynh Phu So   (2) Phan Boi Chau   (3) Liang Qichao   (4) Henri Navarre

Ans. *(1)*

Sol. The French tried to suppress the movement inspired by Huynh Phu So. They declared him mad, called him the Mad Bonze, and put him in a mental asylum.

168. As a part of this movement, Naidhobi bandhs were organized by panchayats to deprive landlords of the services of even barbers and washermen?

(1) Gudem Hills of Andhra Pradesh   (2) Peasant Movement of Awadh

(3) Mepla Movement in Kerala   (4) Kheda Satyagraha in Gujarat

Ans. *(2)*

Sol. In Awadh, peasants were led by Baba Ramchandra – a sanyasi who had earlier been to Fiji as an indentured labourer. The movement here was against talukdars and landlords who demanded from peasants exorbitantly high rents and a variety of other cesses. In many places nai – dhobi bandhs were organised by panchayats to deprive landlords of the services of even barbers and washermen.

169. "Malabar Beauty" painting was made by _____

(1) Raja Ravi Varma '   (2) Chandu Menon   (3) Abanindranath Tagore   (4) Natesha Shastri

Ans. *(1)*

Sol. One of the foremost oil painters of this time was Raja Ravi Varma (1848-1906). Chandu Menon's description of his heroines may have been guided by some of his paintings.

170. The architect who rebuilt Paris in 1852 was _____

(1) Baron Haussmann   (2) T. E. Turner   (3) Francis Garnier   (4) Carl Wecker

Ans. *(1)*

Sol. Baron Haussmann was the chief architect of new Paris and also rebuilt it 17 years after 1952, i.e in 1970.

171. Inquisition means_____

(1) Action, speech or writing that is seen as opposing the government

(2) A former Roman Catholic Court for identifying and punishing heretics

(3) A parchment made from the skin of animal

(4) A sixteenth century movement to reform the Catholic Church dominated by Rome

Ans. *(2)*

Sol. Inquisition – A former Roman Catholic court for identifying and punishing heretics.

172. By the 1860's weavers faced a new problem. They could not get sufficient supply of raw cotton of good quality. Why?

(1) Drought conditions in India and China   (2) Ganjam famine

(3) American civil war   (4) All of these

Ans. **(3)**

Sol. By the 1860s, Civil War broke out and cotton supplies from the US were cut off, Britain turned to India. As raw cotton exports from India increased, the price of raw cotton shot up. Weavers in India were starved of supplies and forced to buy raw cotton at exorbitant prices. In this, situation weaving could not pay.

173. The famous valley of Kashmir is situated between the mountain ranges of_____.

(1) Karakoram and Ladakh   (2) Ladakh and Zaskar

(3) Zaskar and Greater Himalayas   (4) Greater Himalayas and Pirpanjal

Ans. **(2)**

Sol. The Kashmir valley lies between Pir Panjal and Zanskar ranges.

174. Which of the following is NOT correct in relation with Terai region?

(1) Dachigam National Park is located in this region.

(2) It is a swampy and marshy region

(3) This is a thickly forested region full of wild life

(4) The forests in Terai region have been cleared to create agricultural land and to settle the migrants from Pakistan after partition.

Ans. **(1)**

Sol. Terai was a thickly forested region full of wildlife. The forests have been cleared to create agricultural land and to settle migrants from Pakistan after partition. Dudhwa National Park is located in this region, hence option (1) is incorrect.

175. The northern plains get rainfall in winter from_____

(1) North cast monsoons   (2) Local convection

(3) Depressions originating inthe mediterranean sea   (4) South west monsoons

Ans. **(3)**

Sol. A characterstic feature of the cold weather season over the northern plains is the inflow of cyclonic disturbances from the west and the northwest. These low-pressure systems, originate over the Mediterranean Sea and western Asia and move into India, along with the westerly flow. They cause the much-needed winter rains over the plains and snowfall in the mountains.

176. In India, which one of the following types of forests is teak a dominanttree species?

(1) Tropical evergreen forests   (2) Tropical moist deciduous forests

(3) Tropical thorn scrub forests   (4) Alpine forests

Ans. **(2)**

Sol. Teak is the most dominant species of Tropical Deciduous forest.

177. What is the share of India's population in world's population, according to 2001 Census?

(1) 14.2%   (2) 16.7%   (3) 19.3%   (4) 11.8%

Ans. **(2)**

Sol. India's population as on March 2001 stood at 1,028 million, which account for 16.7 per cent of the world's population.

178. Birth rate means_____

(1) the number of live births for every 1000 persons in a year

(2) The number of live births for every 100 persons in a year

(3) The number of live births for every 1000 persons in a decade

(4) The number of live births for every 100 persons in a decade

Ans. **(1)**

Sol. Birth rate is the number of live births per 1000 persons in a year.

179. Which one of the following is the main cause of land degradation in Maharashtra?

(1) Intensive cultivation (2) Over irrigation (3) Deforestation (4) Overgrazing

Ans. *(4)*

Sol. Overgrazing is the main cause of land degradation in Maharashtra, over irrigation in Punjab and Haryana.

180. Which one of the following is wrongly matched?

(1) Endangered species - Indian Rhino (2) Endemic species - Mithun

(3) Extinct species - Pink head duck (4) Vulnerable species - Asiatic Cheetah

Ans. *(4)*

Sol. Asiatic Cheetah comes in the category of Extinct Species.

181. Match the list A with B and select the correct answer.

	(A)		*(B)*
(A)	Wheat	(i)	Moist and humid climate with rainfall of more than 200 cm
(B)	Rice	(ii)	Hot and moist climate with rich soil
(C)	Tea	(iii)	Cool growing season and bright sunshine at the time of ripening
(D)	Rubber	(iv)	Warm and moist climate with high altitude

Codes	A	B	C	D
(1)	(iii)	(ii)	(iv)	(i)
(2)	(i)	(iii)	(ii)	(iv)
(3)	(iii)	(ii)	(i)	(iv)
(4)	(iv)	(iii)	(i)	(ii)

Ans. *(1)*

Sol. As per the given match, Option (1) stands correct.

182. Find out the CORRECT statements.

(i) Balaghat mines in Madhya Pradesh produce 52% of India's copper.

(ii) Odisha is the largest Bauxite producing state in India with 45% of the country's total production.

iii) Mica deposits are found in the North western part of the Deccan Plateau.

iv) Kudremukh Mine's iron ore is transported as slurry through a pipe line to port near Mangalore.

(1) i, iii, iv (2) ii, iii, iv (3) i, ii, iv (4) i, ii, iii, iv

Ans. *(3)*

Sol. Option (iii) is incorrect, as Mica deposits are found in eastern part of the chhotanagpur plateau.

183. Which one of the following statements is NOT CORRECT ?

(1) Kandla is a tidal port. (2) Kolkata is an inland riverine port.

(3) Mangalore is the deepest land locked port. (4) Cochin is a natural harbour.

Ans. *(3)*

Sol. Vishakhapatnam is the deepest landlocked and well-protected port.

184. In which state is the Shivpuri National Park located?

(1) Maharashtra (2) Madhya Pradesh (3) Rajasthan (4) Uttar Pradesh

Ans. *(2)*

Sol. Madhav National Park is situated in Shivpuri District of Gwalior region in northwest Madhya Pradesh, India. It was named after Madho Rao Scindia, the Maharaja of Gwalior belonging to the Scindia dynasty of the Marathas.

185. Nearly half of the voting power in the IMF is in the hands of only seven countries. Which among these is NOT in the seven countries?

(1) Saudi Arabia (2) United Kingdom (3) Germany (4) France

Ans. *(1)*

Sol. Saudi Arabia is not one of the countries having voting power in IMF.

186. Find the wrong sentence.

(1) Women do not have the right to vote in Saudi Arabia.

(2) PRI (Institutional Revolutionary Party) is the winning party in Mexico from 1930 to 2000.

(3) In China, the government is always formed by the Chinese Communist Party.

(4) Indian-Fijians have not been given right to vote in Fiji

Ans. *(4)*

Sol. Indian Fijians have been given voting right in Fiji, but their vote has less value than an indigenous Fiji.

187. Which of these was the most salient underlying conflict in the making of a democratic constitution in South Africa?

(1) Between South Africa and its neighbours.   (2) Between Christians and Muslims

(3) Between the white majority and the black minority (4) Between the white minority and the black majority

Ans. (3)

Sol. There was a conflict between white majority and black minority in South Africa, which led to tensions and hence led to the formation of South African Constitution.

188. Match list A with list B and select the correct answers using the codes given below the lists

	(A)		(B)
(A)	Universal adult franchise	(i)	Reservation of seats for the SC's and ST's
(B)	Represen-tation of weaker sections	(ii)	Any one can form a party or contest elections
(C)	Open political competition	(iii)	Each constituency has roughly the same population
(D)	One vote one value	(iv)	Everyone who is 18 years of age or older has a right to vote

Codes	A	B	C	D
(1)	(ii)	(iii)	(iv)	(i)
(2)	(iii)	(ii)	(i)	(iv)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(i)	(iv)	(iv)	(ii)

Ans. (3)

Sol. As per the given match, Option (3) stands correct.

189. A coalition government in a country is generally formed where there is

(1) one party system   (2) two party system

(3) no party system   (4) multi party system dominated by one party

Ans. (4)

Sol. A coalition government is one in which many parties join hands to form the government, which is dominated by one party.

190. Which of these is a mostly language in India after Hindi

(1) Tamil   (2) Bengali   (3) Telugu   (4) Kannada

Ans. (2)

Sol. Bengali is spoken by 8.11% of the people after Hindi.

191. Which of these related to political party founders is WRONG ?

(1) Bahujan Samaj Party - Kanshiram   (2) Jharkhand Party - Baldev Singh

(3) Swatantra Party - K. M. Munshi   (4) Republican Party of India - B. R. Ambedkar

Ans. (2)

Sol. Baldev Singh was leader of the Panthic Akali Party in the Punjab Assembly.

192. Studies on political and social inequalities in democracy show that_____.

(1) inequalities exist in democracies   (2) inequalities do not exist under dictatorship

(3) democracy and development go together   (4) dictatorship is better than democracy

Ans. (1)

Sol. Inequalities exist in democracies.

193. Find the CORRECT statement(s)

(i) Small farmers constitute about 80 percent of total farmers in India.

(ii) Labour is the most abundant factor of production

(iii) Money is called as fixed capital

(iv) Out of every 100 workers in the rural areas in India, only 24 are engaged m non-farm activities

(1) i, iii, iv   (2) i, iv   (3) i, ii, iv   (4) ii, iii, iv

Ans. (3)

Sol. Money in hand is a working capital, hence this statement is wrong.

194. Infant mortality rate means_____

(1) Death of a child under one year of age
(2) Death of a child under two years of age
(3) Death of a child under three years of age
(4) Death of a child under four years of age

Ans. *(1)*

Sol. Death of a child under one year of age is termed as Infant Mortality Rate.

195. Which of the following states, has the high poverty ratio than India's average poverty ratio?

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

Ans. *(1)*

Sol. Bihar has high poverty ratio than India's average poverty ratio. Orissa and Bihar continue to be the two poorest states with poverty ratios of 47 and 43 per cent respectively.

196. Among the following, who are eligible to benefit from MGNREGA?

(1) Adult members of only SC and ST households

(2) Adult members of BPL households

(3) Adult members of households of all backward communities

(4) all adult members of any household

Ans. *(2)*

Sol. MGNREGA benefits adult members of BPL households.

197. What is the body mass index of person weighing 90 kgs and 1.82 mts tall?

(1) 27.17   (2) 21.42   (3) 29,92   (4) 19.96

Ans. *(1)*

Sol. BMI is calculated as weight in kilograms divided by height in cm. Which is obtained as 27.17 in the following question.

198. Consider the following statements about human development index.

(i) HDI stands for Human Development of India.

(ii) Three levels are considered under Gross Enrollment Ratio.

(iii) Per capita income is calculated in dollers.

(iv) According to the Human Development Index, India is a developed nation.

Which of the given statements are TRUE?

(1) i, ii, iii   (2) ii, iii   (3) ii, iii, iv   (4) i, ii, iii, iv

Ans. *(2)*

Sol. HDI stands for Human Development Index and according to Human Development Index, India is a developing nation.

199. Find the one who DOES NOT belong to primary sector.

(1) Fisherman   (2) Flower cultivator   (3) Potter   (4) Bee-keeper

Ans. *(3)*

Sol. Potter belongs to Secondary Sector, whereas all others belong to primary sector.

200. Find the one that is NOT related to starvation deaths.

(1) Kalahandi - Odisha
(2) Baran - Rajasthan
(3) Kashipur - Madhya Pradesh
(4) Palamau - Jharkhand

Ans. *(3)*

Sol. There are places like Kalahandi and Kashipur in Orissa where famine-like conditions have been existing for many years and where some starvation deaths have also been reported. Starvation deaths are also reported in Baran district of Rajasthan, Palamau district of Jharkhand and many other remote areas during the recent years. Therefore, food security is needed in a country to ensure food at all times.