

Date: 13/11/2016

Max. Marks: 100

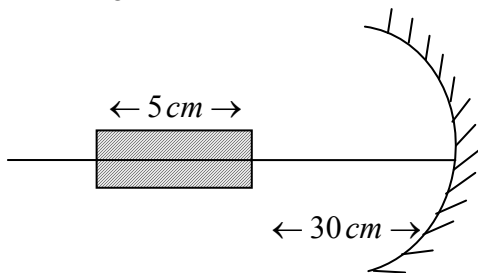
SOLUTIONS

Time allowed: 90 mins

1. A rod of length 5cm lies along the principal axis of the concave mirror of focal length 15 cm in such a way that the end of the closer to the pole is 30 cm away from it. Then the length of the image
(1) 2.75 cm (2) 3.75 cm (3) 4.75 cm (4) None of the above

Ans. (2)

Sol. Given, length of rod = 5cm
focal length = -15 cm



$$u = -30 \text{ cm}$$

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v} = \frac{1}{-30} + \frac{1}{v}$$

$$\frac{1}{-15} = -\frac{1}{30} + \frac{1}{v}, v = -30 \text{ cm}$$

now for again rear end of rod

$$u' = -35 \text{ cm}, v' = ? f = -15, \frac{1}{f} = \frac{1}{u} + \frac{1}{v}, v' = -26.25 \text{ now size of image,}$$

$$|v - v'| = |-30 - (-26.25)| = 3.75 \text{ cm}$$

2. If an object moves towards or away a plane with a velocity v then the image will approach or recede with velocity.
(1) v (2) $2v$ (3) $3v$ (4) $4v$

Ans. (1)

Sol. $x_{om} = -x_{im}$

differentiate with respect to t

$$v_{om} = -v_{im}$$

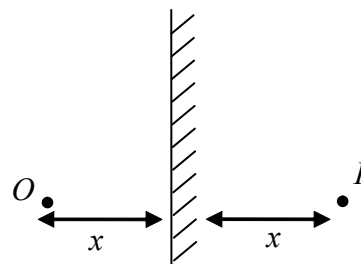
where

V_{om} = velocity of object wrt mirror

V_{im} = velocity of image wrt mirror

x_{om} = distance of object wrt mirror

x_{im} = distance of image wrt mirror



3. The focal length of a concave mirror depends upon

- (1) The distance of the object from the mirror (2) The distance of the image from the mirror
(3) The radius of curvature of the mirror (4) None of the above

Ans. (3)

Sol. $f = \frac{R}{2}$

4. The rainbow is formed due to ?

- (1) Refraction (2) Internal Reflection (3) Dispersion (4) all the above

Ans. (4)

Sol. All the above phenomena are involved in formation of rainbow.

5. A person cannot see distinctly any object placed beyond 40 cm from his eye. What is the power of the lens which will enable him to see distant stars clearly?

- (1) +2.5D (2) -2.5D (3) +3.5D (4) -3.5D

Ans. (2)

Sol. $P = \frac{1}{f} = \frac{1}{-40\text{cm}} = -\frac{100}{40} = -2.5 D$

6. An electrical power station has the power 200 Megawatt (MW), then the electrical energy produced per day will be

- (1) 200 MW-hour (2) 4800 MW-hour (3) 4800 MW (4) 4800 joule

Ans. (2)

Sol. $P = \frac{E}{t}$, $200 MW = \frac{E}{24hr}$

$$4800 MW - \text{hour} = w(\text{electrical energy})$$

7. How many electrons flow per second through the filament of 220V and 110W electric bulb?

- (1) 3.125×10^8 (2) 31.25×10^{18} (3) 3.125×10^{20} (4) 3.125×10^{15}

Ans. (1)

Sol. $P = VI$, $110 = 220 I$, $I = \frac{1}{2} A$

$$I = \frac{q}{t}, q = it, q = \frac{1}{2} \times 1$$

$$q = ne, \frac{1}{2} = n \times 1.6 \times 10^{-19}, n = 3.125 \times 10^{18}$$

8. The S.I. unit of electrical resistivity is?

- (1) ohm (2) m (3) ohm m^{-1} (4) ohm m

Ans. (4)

Sol. $R = \rho \frac{l}{A}$, $\rho = R \times \frac{A}{l} = \Omega \times \frac{m^2}{m} = \Omega m = \text{ohm } m$

9. A bulb of 100 Watt, 250 Volt has the resistance of
 (1) 2500 ohm (2) 625 ohm (3) 25 ohm (4) 2.5 ohm

Ans. (2)

Sol. $P = \frac{V^2}{R}, 100 = \frac{(250)^2}{R}, R = 625 \text{ ohm}$

10. The first artificial satellite was
 (1) Sputnik-1 (2) explorer-1 (3) Aryabhata (4) Luna-3

Ans. (1)

11. A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel.

If the equivalent resistance of this combination is R^1 , then the ratio $\frac{R}{R^1}$ is

- (1) $\frac{1}{25}$ (2) $\frac{1}{5}$ (3) 5 (4) 25

Ans. (4)

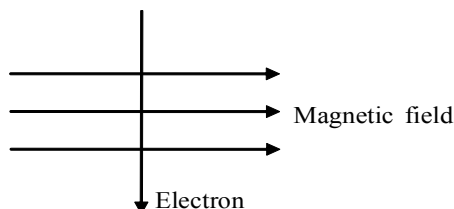
Sol. $R = \rho \frac{l}{A}$, if $l' = \frac{l}{5}$, $R_{\text{new}} = \frac{R}{5}$ all the new resistance added in parallel connection therefore

$$\frac{1}{R^1} = \frac{5}{R} \times 5, R^1 = \frac{R}{25} \Rightarrow \frac{R}{R^1} = \frac{25}{1} = 25$$

12. Magnetic effect of current were discovered by
 (1) Faraday (2) Oersted (3) Joule (4) Ampere

Ans. (2)

13. An electron enters a magnetic field at right angles to it as shown in figure. The direction of force acting on electron will be



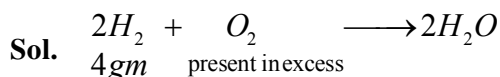
- (1) to the right (2) to the left (3) out of the page (4) into the page

Ans. (4)

Sol. According to Fleming's left hand rule.

14. 10gm of hydrogen is burnt in the presence of excess oxygen. The mass of water formed is
 (1) 90gm (2) 45gm (3) 10gm (4) 18gm

Ans. (1)



Hydrogen is limiting reagent

$$\therefore 4 \text{ gm of } H_2 \longrightarrow 36 \text{ gm of } H_2O$$

$$\therefore 1 \text{ gm of } H_2 \longrightarrow \frac{36}{4} \text{ gm of } H_2O$$

$$\therefore 10 \text{ gm of } H_2 \longrightarrow \frac{36}{4} \times 10 \text{ gm of } H_2O = 90 \text{ gm}$$

15. Which information is not conveyed by a balance chemical equation?

- (1) Physical quantity of reactants and products.
- (2) Symbols and formula of all the substances involved in a particular reaction
- (3) No of atoms/molecules of the reactants and products formed.
- (4) Whether a particular reaction is actually feasible or not.

Ans. (4)

Sol. Feasibility is given by the 2nd law of thermodynamics.

16. Identify the following type of reaction $2KClO_3 \xrightarrow[\text{catalyst}]{\text{heat}} 2KCl(s) + 3O_2(g)$

- (1) It is combination reaction.
- (2) It is a decomposition reaction and is accompanied by release of heat.
- (3) It is a Photo Chemical decomposition reaction and exothermic in nature.
- (4) It is a decomposition reaction and is endothermic in nature.

Ans. (4)

Sol. When heat is utilised in a reaction so it will be endothermic reaction.

17. A solution turns red litmus blue, its pH is likely to be

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

Ans. (4)

Sol. A base turns red litmus blue and its pH is greater than 7

18. A solution reacts with crushed egg shells to give a gas that turns lime water milky. The solution contains

- (1) NaCl
- (2) HCl
- (3) LiCl
- (4) KCl

Ans. (2)

Sol. Egg shell contains $CaCO_3$ which on reaction with acid gives CO_2 which turns lime water milky, hence answer is HCl.

19. The pH of a solution of HCl is 4 shown that the molarity of the solution is

- (1) 4.0 M
- (2) 0.4 M
- (3) 0.000 M
- (4) 0.001 M

Ans. NA

Sol. $pH = 4 \therefore pH = -\log[H^+]$
 $[H^+] = 10^{-4} = 0.0001$

option is not given

20. Which of the following pairs will give displacement reactions?

- (1) NaCl soln and Copper metal
- (2) $MgCl_2$ soln and Aluminium metal.
- (3) $FeSO_4$ solution and Silver metal
- (4) $AgNO_3$ soln and Copper metal.

Ans. (4)

Sol. $AgNO_3$ solution and Cu will show displacement reaction. Cu is more reactive than Ag. It can displace Ag from $AgNO_3$ solution.

- 21.** Which of the following metals is present in the anode mud during the electrolytic refining of copper?
 (1) Sodium (2) Aluminium (3) Gold (4) Iron
Ans. (3)
Sol. Gold is an inert metal hence does not get oxidised at anode. Hence it is found in anode mud.
- 22.** An alloy of Zn and Cu is dissolved in dil HCl. Hydrogen gas is evolved. In this evolution of gas.
 (1) Only zinc reacts with dil HCl (2) Only copper reacts with dil HCl
 (3) Both zinc and copper reacts with dil HCl (4) Only copper reacts with water
Ans. (1)
Sol. $Zn + \text{dil. HCl} \longrightarrow ZnCl_2 + H_2$
 $Cu + \text{dil. HCl} \longrightarrow \text{no reaction}$
- 23.** 5ml each of cone HCl, HNO_3 and a mixture of conc HCl (15ml) and conc HNO_3 (5ml) was taken in a separate test tube and labelled as A.B.C A small piece of metal was put in each test tube, No change occurred in test tube A & B but the metal got dissolved in test tube C. The metal could be
 (1) Al (2) Au (3) Cu (4) Na
Ans. (2)
Sol. Gold dissolves in aqua regia ($HCl + HNO_3$)(3:1)
- 24.** Ethane with the molecular formula C_2H_6 has
 (1) 6 Covalent bonds (2) 7 Covalent bonds (3) 8 Covalent bonds (4) 9 Covalent bonds
Ans. (2)
Sol.
$$\begin{array}{c} H & H \\ | & | \\ H - C - C - H \\ | & | \\ H & H \end{array}$$
 covalent bond = 7
- 25.** Bromine reacts with saturated hydrocarbon at room temperature in the
 (1) Absence of Sun light (2) Presence of Water
 (3) Presence of Sun light (4) Presence of Hydrochloric Acid
Ans. (3)
Sol. Bromine reacts in presence of sunlight. It gives substitution reaction with saturated hydrocarbon.
- 26.** 14 elements after actinium is called
 (1) Lanthanides (2) Actinides (3) d-block elements (4) p-block elements.
Ans. (2)
Sol. Actinides are elements which lie in f-block and come after actinium.
- 27.** The process of photosynthesis is?
 (1) Anabolic (2) Catabolic
 (3) Anabolic and Catabolic (4) None of these
Ans. (1)
Sol. Photosynthesis is constructive or anabolic process in which glucose is synthesized.
- 28.** The book "Origin of species" belongs to :
 (1) Lamarck (2) Weismann (3) Darwin (4) Oparin
Ans. (3)
Sol. Book "Origin of species" belongs to Darwin

- 29.** The wings of butterfly and birds are the example of
(1) Vestigial organ (2) Analogous organ (3) Homologous organ (4) None of these

Ans. (2)

Sol. The structures which are functionally similar but structurally different are called analogous organs. The wings of butterfly and birds have same functions so they are analogous organ.

- 30.** Sex-chromosome found in male human
(1) only X (2) only Y (3) XX (4) X and Y both

Ans. (4)

Sol. X and Y sex chromosome found in male human.

- 31.** Genotypic ratio of Mendel's monohybrid cross is :
(1) 1 : 3 (2) 3 : 1 (3) 9 : 3 (4) 1 : 2 : 1

Ans. (4)

Sol. Genotypic ratio of Mendel's monohybrid cross is 1 : 2 : 1 i.e. 1TT : 2Tt : 1tt.

- 32.** The age of fossils is scientifically determined by:
(1) Radio-carbon dating method (2) by counting the chromosomes
(3) by counting the annual rings (4) none of these

Ans. (1)

Sol. Age of fossils scientifically determined by radio carbon dating method.

- 33.** How many ATP is formed due to complete oxidation of 1 molecule of glucose?
(1) 2 (2) 36 (3) 38 (4) none of these

Ans. (2)

Sol. Glycolysis = 8 ATP

Pyruvate oxidation = 6 ATP

Kreb cycle = 24 ATP

So total = 38 ATP

But as 2 ATP are reused in reoxidation process so total ATP produced are = 36 ATP.

- 34.** What is the blood pressure of a healthy person in a normal state?
(1) 120 / 80 (2) 80 / 120 (3) 160 / 100 (4) 100 / 160

Ans. (1)

Sol. Normal blood pressure of healthy person is 120 / 80.

- 35.** Male reproductive part of the flower is:
(1) Gynoecium (2) Corolla (3) Calyx (4) Androecium

Ans. (4)

Sol. Male reproductive part of flower is androecium.

- 36.** Which enzyme converts protein into peptone found in our food?
(1) Ptyalin (2) Insulin (3) Pepsin (4) None of these

Ans. (3)

Sol. Pepsin is a proteolytic enzyme

- 37.** The yellow colour of urine is due to the presence of which of the following:
(1) Salt (2) Glucose (3) Urochrome (4) Protein

Ans. (3)

Sol. Urochrome pigment is a chemical byproduct of haemoglobin breakdown, which makes colour of urine yellow in case of jaundice.

38. The flow of energy in an ecosystem is:

- (1) Unidirectional (2) Bidirectional (3) Multidirectional (4) In any direction

Ans. (1)

Sol. Energy flows only in one direction from producers to different levels of consumers.

39. Which of the following inherits the characters from generation to generation?

- (1) Gene (2) Sex-chromosome (3) Autosome (4) Nucleosome

Ans. (1)

Sol. Gene is a segment of DNA that inherits the character from generation to generation.

40. In any ecosystem, fungi and bacteria are called:

- (1) Producers (2) Decomposers (3) Consumers (4) None of these

Ans. (2)

Sol. Fungi and bacteria are decomposers as it breakdown dead remains into simpler forms.

41. If one of the zeros of the cubic polynomial $x^3 + ax^2 + bx + c$ is -1 , then the product of the other two zeros is :

- (1) $a - b - 1$ (2) $b - a - 1$ (3) $1 - a + b$ (4) $1 + a - b$

Ans. (3)

Sol. Let $f(x) = x^3 + ax^2 + bx + c$

$\therefore -1$ is one of the root $\therefore f(-1) = 0$

$$(-1)^3 + a(-1)^2 + b(-1) + c = 0$$

$$-1 + a - b + c = 0, \quad c = 1 + b - a$$

Let the roots are α, β & γ

$$\therefore \alpha\beta\gamma = \frac{-c}{1}, \quad \alpha\beta \times (-1) = -c, \quad \alpha\beta = c, \quad \alpha\beta = 1 + b - a = 1 - a + b.$$

42. How many numbers lie between 10 to 300, which when divided by 4 leave a remainder 3.

- (1) 71 (2) 72 (3) 73 (4) 74

Ans. (3)

Sol. Sequence is 11, 15, 19 299

$$299 = 11 + (n-1) \times 4, \quad n-1 = \frac{288}{4}, \quad n = 73$$

43. If $\cos \theta + \sec \theta = 2$, then $\cos^{10} \theta + \sec^{11} \theta = \dots\dots\dots$

- (1) 0 (2) 1 (3) 2 (4) -1

Ans. (3)

Sol. $\cos \theta + \sec \theta = 2$, $\cos^2 \theta - 2 \cos \theta + 1 = 0$

$$(\cos \theta - 1)^2 = 0, \quad \cos \theta = 1$$

$$\Rightarrow \theta = 0^\circ, \quad \cos^{10} \theta + \sec^{11} \theta = 2$$

44. If $xy + yz + zx = 0$, then the value of $\left(\frac{1}{x^2 - yz} + \frac{1}{y^2 - zx} + \frac{1}{z^2 - xy}\right)$
- (1) 3 (2) 0 (3) 1 (4) $x + y + z$

Ans. (2)

Sol. $\frac{1}{x^2 - yz} + \frac{1}{y^2 - zx} + \frac{1}{z^2 - xy}$

$$\Rightarrow \frac{1}{x^2 + xy + zx} + \frac{1}{y^2 + xy + yz} + \frac{1}{z^2 + yz + zx} \Rightarrow \frac{1}{x + y + z} \left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z} \right)$$

$$\Rightarrow \frac{1}{x + y + z} \left(\frac{yz + xz + xy}{xyz} \right) = 0$$

45. The sum of n terms of an AP is given by $(S_n = 2n^2 + 3n)$ what is the common difference of the AP.
- (1) 3 (2) 4 (3) 5 (4) 9

Ans. (2)

Sol. $S_n = 2n^2 + 3n$, $S_{n-1} = 2n^2 - n - 1$, $t_n = S_n - S_{n-1} = 4n + 1$, $d = t_2 - t_1 = 4$

46. A boat goes 16 km upstream and 24 km downstream in 6 hours. Also it covers 12 km up stream and 36 km downstream in the same time. Find the speed of the boat in still water ?

- (1) 8 km/h (2) 4 km/h (3) $2\frac{1}{2}$ km/h (4) None of these

Ans. (1)

Sol. $\frac{16}{x - y} + \frac{24}{x + y} = 6$, $\frac{12}{x - y} + \frac{36}{x + y} = 6$

$$\Rightarrow x = 8 \text{ km/hr}$$

47. If $\sin A + \sin^2 A = 1$, then $\cos^2 A + \cos^2 A = \dots\dots\dots$
- (1) $1/2$ (2) 1 (3) 2 (4)

Ans. (2)

Sol. $\sin A + \sin^2 A = 1$, $\sin A = \cos^2 A$

$$\therefore \cos^2 A + \cos^4 A = \cos^2 A + \sin^2 A = 1$$

48. $\sqrt{\frac{\sec A - \tan A}{\sec A + \tan A}} = ?$
- (1) $\sec A - \tan A$ (2) $\sec A + \tan A$ (3) $\sec A \cdot \tan A$ (4) None of these

Ans. (1)

Sol. $\sqrt{\frac{(\sec A - \tan A)(\sec A - \tan A)}{(\sec A + \tan A)(\sec A - \tan A)}}$

$$= \sqrt{\frac{(\sec A - \tan A)^2}{1}} = \sec A - \tan A$$

49. If $\cos 9\alpha = \sin \alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$?

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

Ans. (3)

Sol. $\cos 9\alpha = \sin \alpha$

$$\Rightarrow 9\alpha = 90 - \alpha \Rightarrow \alpha = 9^\circ$$

$$\therefore \tan 5\alpha = \tan 45^\circ = 1$$

50. If $x = a \cos^3 \theta$ and $y = b \sin^3 \theta$ then $\left(\frac{x}{a}\right)^{\frac{2}{3}} + \left(\frac{y}{b}\right)^{\frac{2}{3}} = ?$

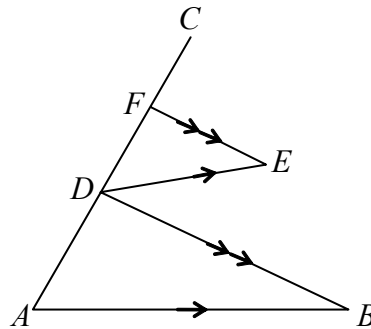
- (1) 2 (2) a (3) b (4) 1

Ans. (4)

Sol. $\left(\frac{x}{a}\right)^{\frac{1}{3}} = \cos \theta$ and $\left(\frac{y}{b}\right)^{\frac{1}{3}} = \sin \theta$

$$\text{Squaring and adding } \left(\frac{x}{a}\right)^{\frac{2}{3}} + \left(\frac{y}{b}\right)^{\frac{2}{3}} = 1.$$

51. In the figure, $AB \parallel DE$ and $BD \parallel EF$, then



- (1) $AD^2 = CF \times AC$ (2) $DC^2 = CF \times AC$
 (3) $CE^2 = DE \times BF$ (4) $EF^2 = BD \cdot AB$

Ans. (2)

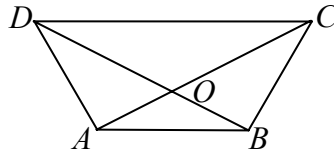
Sol. In $\triangle ABC$ by Thales theorem $\frac{AC}{CD} = \frac{BC}{CE}$... (1)

In $\triangle CDB$ by Thales theorem $\frac{CD}{CF} = \frac{BC}{CE}$... (2)

From equation (1) & (2)

$$\therefore CD^2 = AC \times CF$$

52. In the given figure, $ABCD$ is a trapezium which $AB \parallel CD$ and its diagonals intersect at O . If $AO = (3x-1)$ cm, $OC = (5x-3)$ cm, $BO = (2x+1)$ cm and $OD = (6x-5)$ cm, find the value of x .



(1) $\frac{1}{2}$

(2) 3

(3) 4

(4) 2

Ans. (4)

Sol. $\frac{AO}{OC} = \frac{OB}{OD}$

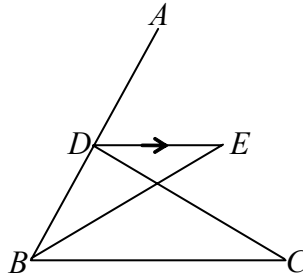
$$\Rightarrow \frac{3x-1}{5x-3} = \frac{2x+1}{6x-5}$$

Solving for x , $8x^2 - 20x + 8 = 0$

$x = 2$, $x = \frac{1}{2}$ for $x = \frac{1}{2}$ length becomes negative.

Hence $x = 2$.

53. In the given figure, $DE \parallel BC$ and $AD:DB = 5:4$, find the ratio area $(\triangle DFE):$ area $(\triangle CFB)$.



(1) 5 : 9

(2) 4 : 9

(3) 25 : 81

(4) 81 : 25

Ans. (3)

Sol. Since $\triangle DFE \sim \triangle CFB$

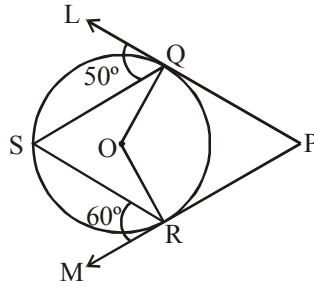
$$\frac{ar(\triangle DFE)}{ar(\triangle CFB)} = \left(\frac{DE}{BC}\right)^2 \quad \dots(1)$$

since $\triangle ADE \sim \triangle ABC$

$$\frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{9}$$

From (1) $\frac{ar(\triangle DFE)}{ar(\triangle CFB)} = \left(\frac{DE}{BC}\right)^2 = \frac{25}{81}$

54. In the given figure, O is the centre of a circle PQL and PRM are the tangents at the points QRS respectively and S is a point on the circle such that $\angle SQL = 50^\circ$ and $\angle SRM = 60^\circ$. Then, $\angle QSR = ?$



- (1) 40° (2) 50° (3) 60° (4) 70°

Ans. (4)

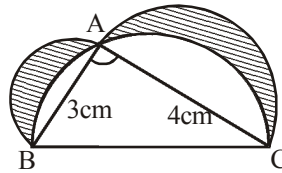
Sol. $OQ \perp PQ$ and $OR \perp RP$

$\triangle OSR$, $OR = OS = \text{radius}$

$$\angle OSR = \angle ORS = 30^\circ$$

Similarly, $\angle OSQ = 40^\circ$, $\angle QSR = 30 + 40 = 70^\circ$

55. In the given figure, $\triangle ABC$ is a right-angled triangle semicircles are drawn on AB, AC and BC as diameters. It is given that $AB = 3 \text{ cm}$ and $AC = 4 \text{ cm}$. Find the area of shaded region.



- (1) 12 cm^2 (2) 6 cm^2 (3) 9 cm^2 (4) 15 cm^2

Ans. (2)

Sol. In $\triangle ABC$

$$BC = \sqrt{AB^2 + AC^2} = 5 \text{ cm}$$

$$ar(\widehat{AB}) + ar(\widehat{AC}) + ar(\triangle) - ar(\widehat{BC})$$

$$= \frac{\pi}{2} \left(\frac{3}{2} \right)^2 + \frac{\pi}{2} \left(\frac{4}{2} \right)^2 + \frac{1}{2} \times 3 \times 4 - \frac{\pi}{2} \left(\frac{5}{2} \right)^2 = 6$$

56. Water flows through a circular pipe whose internal diameter is 2 cm, at the rate of 0.7m/s into a cylindrical tank, the radius of whose base is 40cm. How much will the level of water rise in the tank in half an hour ?

- (1) 75 cm (2) 75.25 cm (3) 78 cm (4) 78.75 cm

Ans. (4)

Sol. Volume of circular pipe = volume of tank.

$$h = \frac{0.7 \times 100 \times 60 \times 30}{40 \times 40}$$

$$h = 78.75 .$$

57. The probability that it will rain today is 0.84. What is the probability that it will not rain today?
 (1) 2 (2) 1 (3) 0.16 (4) 0.61

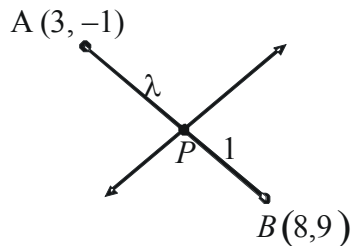
Ans. (3)

Sol. $P(E') = 1 - 0.84 = 0.16$

58. In what ratio does the line $x - y - z = 0$. Divide the line segment joining the point $A(3, -1)$ and $B(8, 9)$
 (1) 3 : 2 (2) 2 : 3 (3) 3 : 1 (4) 3 : 5

Ans. (NA)

Sol. Here given line should be $x - y - 2 = 0$.



$$P = \left(\frac{8\lambda + 3}{\lambda + 1}, \frac{9\lambda - 1}{\lambda + 1} \right)$$

Now this should satisfy the line. hence $\lambda = \frac{3}{2}$

59. If points $A(a, 0)$, $B(0, b)$ and $C(1, 1)$ are collinear, then $\frac{1}{a} + \frac{1}{b} = ?$
 (1) 0 (2) 1 (3) 2 (4) $\frac{1}{2}$

Ans. (2)

Sol. $ar(\Delta ABC) = 0, \therefore \Delta = \frac{1}{2} \begin{vmatrix} a & 0 & 1 \\ 0 & b & 1 \\ 1 & 1 & 1 \end{vmatrix} = 0$

$$a(b - 1) + 1(0 - b) = 0$$

$$ab - a - b = 0$$

$$ab = a + b$$

$$1 = \frac{1}{a} + \frac{1}{b}$$

60. The mean and mode of a frequency distribution are 28 and 16 respectively, then the median is :
 (1) 23.5 (2) 22 (3) 24 (4) 24.5

Ans. (3)

Sol. We have

$$\text{Mode} = 3(\text{median}) - 2(\text{mean})$$

$$\Rightarrow 16 = 3(\text{median}) - 2 \times 28 \Rightarrow 3(\text{median}) = 56 + 16$$

$$\Rightarrow 3(\text{median}) = 72$$

$$\Rightarrow \text{median} = 24.$$

61. “Indian War of Independence, 1857” was written by

- | | |
|--------------------|---------------------|
| (1) R. C. Majumdar | (2) S. B. Choudhari |
| (3) S. N. Sen | (4) V. D. Savarkar |

Ans. (4)

Sol. The Indian War of Independence is an Indian nationalist history of the 1857 revolt by Vinayak Damodar Savarkar that was first published in 1909.

62. Who was the Nawab of Bengal during the “Battle of Plassey” ?

- | | |
|--------------------|-------------------|
| (1) Mir Jafar | (2) Mir Kasim |
| (3) Sirj-ud-daulla | (4) None of these |

Ans. (3)

Sol. The battle took place at Palashi (Anglicised version: Plassey) on the banks of the Bhagirathi River, about 150 kilometres (93 mi) north of Calcutta and south of Murshidabad, then capital of Bengal (now in Nadia district in West Bengal). The belligerents were the Nawab Siraj-ud-daulah, the last independent Nawab of Bengal, and the British East India Company. Siraj-ud-daulah had become the Nawab of Bengal the year before, and he ordered the English to stop the extension of their fortification. Robert Clive bribed Mir Jafar, the commander in chief of the nawab’s army, and also promised him to make him Nawab of Bengal. He defeated the Nawab at Plassey in 1757 and captured Calcutta.

63. Who said “Tilak is the father of Indian unrest ?”

- | | |
|----------------|-------------------|
| (1) V. Chirol | (2) Louis Fischer |
| (3) Web Miller | (4) Lord Reading |

Ans. (1)

Sol. Bal Gangadhar Tilak joined congress in 1890. Valentine Chirol called him “Father of Indian Unrest”, who first of all demanded complete “Swarajya”.who-is-known-as-father-of-indian-unrest.

64. The Mountbatten plan became the basis for

- | | |
|--------------------------------|-----------------------------------|
| (1) Continuity of British rule | (2) Transfer of Power |
| (2) Partition of the Country | (4) Solution of communal problems |

Ans. (3)

Sol. This was also known as the Mountbatten Plan. The British government proposed a plan announced on 3 June 1947 that included these principles: Principle of Partition of India was accepted by the British Government. Successor governments would be given dominion status.

65. By whom the “Quit India” resolution was moved in the Bombay Session of the Congress in the year 1942 ?

- | | |
|----------------------|---------------------|
| (1) Jawaharlal Nehru | (2) Narendra Deo |
| (3) Rajendra Prasad | (4) J. B. Kripalani |

Ans. (1)

Sol. Resolution was called by Jawaharlal Nehru to join the Quit India Movement. Mashriqi was apprehensive of its outcome and did not agree with the Congress Working Committee’s resolution. On 28 July 1942, AllamaMashriqi sent the following telegram to MaulanaAbulKalam Azad, Khan Abdul Ghaffar Khan, Mahatma Gandhi, C. Rajagopalachari, Jawaharlal Nehru, Rajendra Prasad and Dr. PattabhiSitaramayya

66. Lahore session of Muslim League (1940) was presided over by –

- | | |
|-----------------------|-------------------------|
| (1) Liaquat Ali Khan | (2) Mohammad Ali Jinnah |
| (3) Mohammad Sarfaraj | (4) Fatima Jinnah |

Ans. (2)

Sol. This was the moment when Muhammad Ali Jinnah, the former ambassador of Hindu-Muslim unity, totally transformed himself into Pakistan's great leader.

67. The first leader to coin the word 'Swaraj' was -

- | | |
|-------------------------|---------------------|
| (1) Bal Gangadhar Tilak | (2) Lala Lajpat Rai |
| (3) S. C. Bose | (4) Mahatma Gandhi |

Ans. (1)

Sol. Bal Gangadhar Tilak coined that word first. He stated "Swaraj — Our Birth-Right" "We want equality. We cannot remain slaves under foreign rule. We will not carry for an instant longer, the yoke of slavery that we have carded all these years. Swaraj is our birth right."

68. The Policy of Liberalisation, Privatisation and Globalisation was announced as Economic Policy by Prime Minister-

- | | |
|-------------------|-----------------------------|
| (1) Rajiv Gandhi | (2) Vishwanath Pratap Singh |
| (3) Narasimha Rao | (4) Atal Bihari Vajpayee |

Ans. (3)

Sol. The former prime minister P V Narasimha Rao, who spearheaded economic liberalisation policies in the early 1990s. Rao was often referred to as Chanakya for his ability to steer tough economic and political legislation through the parliament at a time when he headed a minority government.

69. The Arya Mahila Sabha was founded by :

- | | |
|---------------------------|---------------------|
| (1) Raj Kumari Amrit Kaur | (2) Nellie Sengupta |
| (3) Durgabai Deshmukh | (4) Pandita Ramabai |

Ans. (4)

Sol. After Medhvi's death, Ramabai moved to Pune where she founded Arya MahilaSamaj, which is Sanskrit for "Noble Women's Society." ... When in 1882 a commission was appointed by Government of India to look into education, Ramabai gave evidence before it.

70. The first President of the All India Trade Union Congress was –

- | | | | |
|-----------------|---------------------|-----------------|-----------------|
| (1) S. A. Dange | (2) Lala Lajpat Rai | (3) Z. A. Ahmed | (4) N. M. Joshi |
|-----------------|---------------------|-----------------|-----------------|

Ans. (2)

Sol. The All India Trade Union Congress (AITUC) is the oldest trade union federations in India and one of the five largest. According to provisional statistics from the Ministry of Labour, AITUC had a membership of 2,677,979 in 2002. It was founded on 31 October 1920 in Bombay by Lala Lajpat Rai, Joseph Baptista, N. M. Joshi and a few others and, until 1945 when unions became organised on party lines, it was the primary trade union organisation in India. Since then, it has been associated with the Communist Party of India

71. Who among the following was founder of the “Khudai Khidmatgar Organization?”

- (1) Khan Abdul Ghaffar Khan (2) Abdur Rab Nishtar
(3) Shaukatullah Ansari (4) Khan Adul Quayum Khan

Ans. (1)

Sol. KhudaiKhidmatgar literally translates as the servants of God, represented a non-violent struggle against the British Empire by the Pashtuns (also known as Pathans, Pakhtuns or Afghans) of the North-West Frontier Province of British India (now in Pakistan).

Also called “Surkh Posh” or “Red Shirts”, it was originally a social reform organisation focussing on education and the elimination of blood feuds known as the Anjuman-e-Islah-e Afghania (society for reformation of Afghans). The movement was led by Khan Abdul Ghaffar Khan, known locally as Bacha Khan or Badshah Khan.

72. In 1526 who established the Mughal Empire in India?

- (1) Akbar (2) Babar (3) Humayun (4) Turks

Ans. (2)

Sol. The Mughal Empire was founded by Babur, a Central Asian ruler who was descended from the Turco-Mongol conqueror Timur (the founder of the Timurid Empire) on his father’s side and from Chagatai, the second son of the Mongol ruler Genghis Khan, on his mother’s side

73. Who became the Badashah of India in 1720?

- (1) Murshid Kuli Khan (2) Paraweza
(3) Muhammad Shah (4) Azimushan

Ans. (3)

Sol. Nasir-ud-Din Muhammad Shah, Nasir-ud-Din Muhammad Shah Irkhwaz, Abu Al-Fatah Nasir-ud-Din Roshan Akhtar Muhammad Shah (17 August 1702 – 26 April 1748), (was the Mughal emperor between 1719 and 1748. He was son of Khujista Akhtar, the fourth son of Bahadur Shah I. With the help of the Sayyid brothers, he ascended the throne at the young age of 17.

74. Martin Luthar was of which country ?

- (1) England (2) Germany (3) France (4) America

Ans. (2)

Sol. Martin Luther (10 November 1483 – 18 February 1546) was a German professor of theology, composer, priest, monk^[2] and a seminal figure in the Protestant Reformation.

75. Which French colony became the part of India in 1954?

- (1) Kerala (2) Madras (3) Pondichery (4) Goa

Ans. (3)

Sol. Puducherry has history recorded only after the advent of the colonial powers such as the Dutch, Portuguese, English and the French. Nearby places such as Arikamedu, Ariyankuppam, Kakayanthoppe, Villianur, and Bahur, which were annexed by the French East India Company over a period of time and became the Union Territory of Puducherry after Independence, have written histories that predate the colonial era.

76. Assertion (A) : The eastern part of western Ghat receives very little rain.

Reason (R) : It lies in a region too hot to allow precipitation.

- (1) Both A and R are true and R explains A (2) Both A and R are true but R does not explain A
(3) A is true and R is false (4) A is false and R is true

Ans. (3)

Sol. A is true and R is False .

77. Arrange the following national parks/sanctuaries of India from north to south according to their location.

I. Periyar II. Kanheri III. Bandipur IV. Gir

(1) IV – III – I – II (2) IV – II – III – I (3) IV – I – II – III (4) I – II – III – IV

Ans. (2)

Sol. The Gir Forest National Park and Wildlife Sanctuary (also known as Sasan-Gir, and girwan) is a forest and wildlife sanctuary near Talala Gir in Gujarat, India. Established in 1965, with a total area of 1,412 km² (545 sq mi) (about 258 km² (100 sq mi) for the fully protected area of the national park and 1,153 km² (445 sq mi) for the Sanctuary, the park is located 43 km (27 mi) north-east of Somnath, 65 km (40 mi) south-east of Junagadh and 60 km (37 mi) south-west of Amreli.

Bandipur National Park established in 1974 as a tiger reserve under Project Tiger, is a national park located in the south Indian state of Karnataka. It was once a private hunting reserve for the Maharaja of the Kingdom of Mysore but has now been upgraded to Bandipur Tiger Reserve.^[1] Bandipur is known for its wildlife and has many types of biomes, but dry deciduous forest is dominant.

The *Kanheri* : constitute a group of rock-cut monuments that are located to the southeast of Borivali on the western outskirts of Mumbai, the capital city of Indian State of Maharashtra. Located within the forests of the Sanjay Gandhi *National Park*. Periyar National Park and Wildlife Sanctuary :It is located high in

the Cardamom Hills and Pandalam Hills of the south Western Ghats along the border with Tamil Nadu. It is 4 km (2.5 mi) from Kumily, approximately 100 km (62 mi) east of Kottayam, 110 km (68 mi) west of Madurai and 120 km (75 mi) southeast of Kochi.

78. Match List-I (Atomic Power Plant) with List-II (State) and select the correct answer using the codes given below :

List I (Atomic Power Plant)

A. Tarapur

B. Rana Pratap Sagar

C. Narora

D. Kalpakkam

(1) A–IV, B–I, C–II, D–III

(3) A–III, B–II, C–I, D–IV

List-II (State)

I. Tamil Nadu

II. Uttar Pradesh

III. Maharashtra

IV. Rajasthan

(2) A–III, B–IV, C–II, D–I

(4) A–III, B–I, C–II, D–IV

Ans. (2)

Sol. As per the given match option (2) is correct.

79. Match List-I (Railway zone) with List-II (Headquarter) and select the correct answer using the codes given below :

List I (Railway Zone)

A. Eastern

B. South Central

C. North Western

D. North Central

(1) A–II, B–I, C–III, D–IV

(3) A–II, B–III, C–IV, D–I

List-II (Headquarter)

I. Secunderabad

II. Kolkata

III. Allahabad

IV. Jaipur

(2) A–II, B–I, C–IV, D–III

(4) A–II, B–IV, C–III, D–I

Ans. (2)

Sol. As per the given match option (2) is correct.

80. Assertion (A) : There is a clockwise circulation of ocean currents in the northern hemisphere.

Reason (R) : This is in the conformity with Ferrel's Law

- (1) Both A and R are true and R explains A (2) Both A and R are true but R does not explain A
(3) A is true and R is false (4) A is false and R is true

Ans. (1)

Sol. This rotation causes both the wind and ocean currents to move from east to west. Thus, the wind movement and ocean currents in the northern hemisphere go clockwise and counter clockwise in the southern hemisphere. The Coriolis Effect also causes ocean surface currents to be deflected to the right of the winds.

81. Which of the following are wrongly matched ?

- A. Tropic of Cancer - 23.5° N latitude B. Tropic of Capricorn - 66.5° N latitude
C. Indian Standard Time - 82° E longitude D. Antarctic Circle - 66.5° S latitude
(1) only A (2) A and B (3) B and C (4) A, B and D

Ans. (3)

Sol. (B) Tropic of Capricorn - 66.5° S latitude and (C) Indian Standard Time - $82\frac{1}{2}^\circ$ E longitude

82. Match list - I (Thermal Power Plant) with List - II (State) and select the correct answer using the codes given below :

List I (Thermal Power Plant)

List-II (State)

A. Ramgundam

I. Odisha

B. Korba

II. Bihar

C. Jharsuguda

III. Andhra Pradesh

D. Batauni

IV. Chhattisgarh

(1) A-III, B-I, C-IV, D-II

(2) A-III, B-IV, C-I, D-II

(3) A-III, B-IV, C-II, D-I

(4) A-I, B-II, C-III, D-IV

Ans. (2)

Sol. As per the given match option (2) is correct.

83. Which river flows through a narrow valley between the Vindhya and Satpura ranges?

- (1) Narmada (2) Tapi
(3) Both of these (4) None of these

Ans. (1)

Sol. The Narmada, It is one of only three major rivers in peninsular India that run from east to west (longest west flowing river), along with the Tapi River and the Mahi River. It is one of the rivers in India that flows in a rift valley, flowing west between the Satpura and Vindhya ranges.

84. Match List - I (River Valley Project) with List - II (River) and select the correct answer using the codes given below :

List I (River Valley Project)

List-II (River)

A. Hirakund

I. Betwa

B. Ukai

II. Sutlej

C. Matatila

III. Mahanadi

D. Bhakhra Nangal

IV. Tapi

(1) A-III, B-IV, C-II, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-III, B-II, C-IV, D-I

(4) A-I, B-II, C-III, D-IV

Ans. (2)

Sol. As per the given match option (2) is correct.

85. Copper - Gold - Iron - Coal are related to :

- (1) Kolar – Khetri – Jharia – Kudremukh (2) Kolar – Kudremukh – Khetri – Jharia
(3) Khetri – Kolar – Kudremukh – Jharia (4) Khetri – Kolar – Jharia – Kudremukh

Ans. (3)

Sol. As per the given match option (3) is correct.

86. Match List - I (Hydroelectric Project) with List - II (State) and select the correct answer using the codes given below :

List I (Hydroelectric Project)

List-II (State)

A. Koyna

I. Kerala

B. Pong

II. Jammu & Kashmir

C. Idukki

III. Maharashtra

D. Salal

IV. Himachal Pradesh

(1) A – III, B – I, C – IV, D – II

(2) A – III, B – IV, C – III, D – I

(3) A – III, B – IV, C – I, D – II

(4) A – I, B – II, C – III, D – IV

Ans. (3)

Sol. As per the given match option (3) is correct.

87. Assertion (A): Sugarcane is not produced in all the States of India.

Reason (R): Geographical conditions in the States are different.

(1) Both A and R are true and R explains A

(2) Both A and R are true but R does not explain A

(3) A is true and R is false

(4) A is false and R is true

Ans. (1)

Sol. As per the given match option (1) is correct.

88. Which of the following soils is more fertile?

(1) Bangar

(2) Khadar

(3) Laterite

(4) Red Soil

Ans. (2)

Sol. Khadar is more fertile.

89. The Ganges of the South is

(1) Kaveri

(2) Godavari

(3) Narmada

(4) Krishna

Ans. (2)

Sol. Godavari is known as Ganga of South.

90. The origin of Himalaya was in which era?

(1) Tertiary

(2) Miocene

(3) Paleozoic

(4) Pleistocene

Ans. (1)

Sol. Himalaya originated in Tertiary era.

91. Who was Chairman of the committee which proposed Democratic decentralisation and Panchayati Raj?

(1) K. M. Pannikar

(2) H. N. Kunjru

(3) Mahatma Gandhi

(4) Balwant Rai Mehta

Ans. (4)

Sol. The Balwant Rai Mehta Committee was a committee appointed by the Government of India in January 1957 to examine the working of the Community Development Programme(1952) and the National Extension Service(1953) and to suggest measures for their better working. The Chairman of this committee was Balwantrai G Mehta. The committee submitted its report in November 1957 and recommended the establishment of the scheme of 'democratic decentralisation' which finally came to be known as PanchayatiRaj.The main aim of Panchayat raj system is to settle the local problems locally and to make the people politically conscious.

92. Which one of the following not a constitutional body?

- | | |
|-------------------------------------|-------------------------------------|
| (1) Union Public Service Commission | (2) State Public Service Commission |
| (3) Finance Commission | (4) NITI Commission |

Ans. (4)

Sol. NITI Commission is not a constitutional body.

93. Right to vote in India is a

- | | |
|-----------------------|--------------------------|
| (1) Fundamental Right | (2) Constitutional Right |
| (3) Natural Right | (4) Legal Right |

Ans. (4)

Sol. Right to vote in India is a Legal Right.

94. The Chairman of the Rajya Sabha is –

- | | |
|---|---|
| (1) Appointed by the President | (2) Elected by Parliament |
| (3) The Vice-President is ex-officio Chairman | (4) Elected by the members of the Council of States |

Ans. (3)

Sol. The Chairman of the Rajya Sabha is the Vice-President.

95. Who among the following is the head of Indian Republic

- | | |
|-------------------------|--|
| (1) President of India. | (2) Prime Minister of India. |
| (3) Cabinet | (4) Political head along with Council of Ministers |

Ans. (1)

Sol. President of India is the head of Indian republic.

96. NABARD came into existence in the year –

- | | | | |
|----------|----------|----------|----------|
| (1) 1979 | (2) 1980 | (3) 1981 | (4) 1982 |
|----------|----------|----------|----------|

Ans. (4)

Sol. National Bank for Agriculture and Rural Development (NABARD) is an apex development bank in India, headquartered at Mumbai with branches all over India.^[2] The Bank has been entrusted with “matters concerning policy, planning and operations in the field of credit for agriculture and other economic activities in rural areas in India”. NABARD is active in developing financial inclusion policy and is a member of the Alliance for Financial Inclusion

97. Major Banks (14) were nationalized in the year-

- | | | | |
|----------|----------|----------|----------|
| (1) 1968 | (2) 1969 | (3) 1970 | (4) 1971 |
|----------|----------|----------|----------|

Ans. (2)

Sol. The Government of India issued an ordinance (‘Banking Companies (Acquisition and Transfer of Undertakings) Ordinance, 1969’) and nationalised the 14 largest commercial banks with effect from the midnight of 19 July 1969. These banks contained 85 percent of bank deposits in the country.

98. Which one of the following is not a tax/duty levied by the Government of India?

- (1) Service Tax (2) Education Tax (3) Custom Duty (4) Toll Tax

Ans. (4)

Sol. Toll Tax is not a tax/duty levied by the Government of India.

99. Government of India enacted Consumer Protection Act in the year

- (1) 1951 (2) 1975 (3) 1990 (4) 1986

Ans. (4)

Sol. Consumer Protection Act, 1986 is an Act of the Parliament of India enacted in 1986 to protect the interests of consumers in India. It makes provision for the establishment of consumer councils and other authorities for the settlement of consumers' disputes and for matters connected therewith.

100. The Indian Economy is a

- (1) Liberal Economy (2) Socialist Economy (3) Mixed Economy (4) None of these

Ans. (3)

Sol. The features of a mixed economy which exist in India are: Private ownership of means of production: This is observed in most of the agricultural, industrial and service sectors. Important role of market mechanism: Market forces of demand and supply have a free role in determining the price of the commodity