

Date: 6/11/2016

Max. Marks: 100

SOLUTIONS

Time allowed: 90 mins

101. Consider the motion of the tip of the minute hand of a clock in one hour. Which of the following statement is wrong?

- (1) The average speed of the tip is zero. (2) Average acceleration of the tip is zero.
(3) Average velocity of the tip is zero. (4) The displacement of the tip is zero.

Ans. (1)

Sol. Average speed = $\frac{\text{Total distance}}{\text{total time}}$

$$\text{for minute hand} = \frac{2\pi r}{60 \times 60} \text{ m/s}$$

\therefore Average speed of tip is not zero.

102. A body is projected vertically up with a speed 'u'. The time taken by the body to return back to ground is.

- (1) $t = \frac{u}{g}$ (2) $t = \frac{2u}{g}$ (3) $t = \frac{1}{2} (ug)$ (4) $t = \frac{4u}{g}$

Ans. (2)

Sol. $v = u + at$

time taken to go up = t

At maximum height, $v = 0$

$$\therefore 0 = u - gt$$

$$t = \frac{u}{g}$$

$$\text{total time} = 2t = \frac{2u}{g}$$

103. A body of mass 5 kg initially at rest is moved by a horizontal force of 2N on a smooth horizontal surface. The work done by the force in 10 seconds is.

- (1) 10 J (2) 50 J (3) 40 J (4) 20 J

Ans. (3)

Sol. $m = 5 \text{ kg}$; $F = 2\text{N}$; $t = 10 \text{ sec}$; $u = 0$

$$a = \frac{F}{m} = \frac{2}{5} \text{ m/s}^2$$

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

$$\Rightarrow \frac{1}{2} \times \frac{2}{5} \times 10 \times 10 = 20\text{m}$$

$$W = F \times S$$

$$= 2 \times 20 = 40 \text{ J}$$

- 104.** A retarding force of 150 N is applied to a body of mass 50 kg which is moving with a speed of 30 m/s. The time taken by the body to come to rest is
 (1) 20 seconds (2) 30 seconds (3) 5 seconds (4) 10 seconds

Ans. (4)

Sol. $F = 150 \text{ N}$, $m = 50 \text{ kg}$, $u = 30 \text{ m/s}$, $v = 0$

$$a = \frac{F}{m} = \frac{150}{50} = 3 \text{ m/s}^2$$

$$\therefore v = u + at$$

$$0 = 30 - (3 \times t)$$

$$t = \frac{30}{3} = 10 \text{ sec.}$$

- 105.** A man standing between two parallel cliffs fires a gun. If he hears first and second echoes after 1.5 seconds and 3.5 seconds respectively, then the distance between two cliffs is.

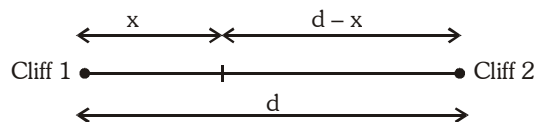
(Take velocity of sound in air as 340 m/s).

- (1) 1190 m (2) 850 m (3) 595 m (4) 510 m

Ans. (2)

Sol. For first echo, $t = 1.5 \text{ s}$, $v = 340 \text{ m/s}$

$$v = \frac{2x}{t} \Rightarrow x = \frac{v \times t}{2} = \frac{340 \times 1.5}{2} \dots\dots\dots(1)$$



For second echo, $t = 3.5 \text{ s}$, $v = 340 \text{ m/s}$

$$v = \frac{2(d-x)}{t} \Rightarrow (d-x) = \frac{v \times t}{2} = \frac{340 \times 3.5}{2} \dots\dots\dots(2)$$

Adding (1) and (2)

$$x + d - x = \frac{340 \times 1.5}{2} + \frac{340 \times 3.5}{2}$$

$$d = 850 \text{ m}$$

- 106.** The characteristic of sound that would result in an increase in loudness of a sound is

- (1) Amplitude (2) Speed (3) Pitch (4) Quality

Ans. (1)

Sol. Loudness of sound wave depends upon its amplitude.

- 107.** Of the following, the specific heat is minimum for

- (1) Water (2) Sea-water (3) Kerosene oil (4) Mercury

Ans. (4)

Sol. Mercury has minimum specific heat (0.140 J/g°C)

- 108.** A fan produces a feeling of comfort because

- (1) fan supplies a cool air (2) evaporation of sweat
 (3) fan cools the air (4) fan increases humidity in air

Ans. (2)

Sol. A fan produces a feeling of comfort because of evaporation of sweat.

- 109.** A radii of curvature of two faces of a biconvex lens of refractive index are in the ratio of 2 : 3. The focal length of the lens is 12 cm. The radius of curvature of the surface with low value of radius of curvature is.
 (1) 5 cm (2) 10 cm (3) 15 cm (4) 20 cm

Ans. (Bonus)

Sol.

- 110.** The change in focal length of an eye lense is caused by the action of
 (1) pupil (2) retina (3) ciliary muscles (4) iris

Ans. (3)

Sol. Ciliary muscles are responsible for change in focal length of an eye lens.

- 111.** If a charge 3 C experiences a force of 3000 N when it is moved in a uniform electric field, then the potential difference between two points separated by distance of 1 cm is
 (1) 10 V (2) 1000 V (3) 3000 V (4) 9000 V

Ans. (1)

Sol.
$$v = \frac{W}{q} = \frac{f \times d}{q} = \frac{3000 \times 1 \times 10^{-2}}{3} = 10 \text{ V}$$

- 112.** n conducting wires of same dimensions but having resistivities 1, 2, 3, n are connected in series. The equivalent resistivity of the combination is....

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

Ans. (1)

Sol.
$$R = \rho \frac{\ell}{A}$$

In series combination

$$R = R_1 + R_2 + R_3 + \dots\dots\dots R_n$$

$$\rho \frac{\ell}{A} = \frac{\ell}{A} (1 + 2 + 3 + \dots\dots\dots n)$$

$$\frac{\rho \ell}{A} = \frac{\ell}{A} \times \frac{n(n+1)}{2}$$

equivalent resistivity = $\frac{n(n+1)}{2}$

- 113.** A body of mass 2 kg starts from rest and moves with uniform acceleration. It acquires a velocity of 20 m/s in 4 seconds. The power exerted on the body in 2 seconds is
 (1) 50 watts (2) 100 watts (3) 150 watts (4) 200 watts

Ans. (1)

Sol. $m = 2\text{kg}, u = 0, v = 20 \text{ m/s}, t = 4 \text{ sec}$

$v = u + at$

$20 = 0 + a \times 4$

$a = 5 \text{ m/s}^2$

In two sec.

$v = u + 5 \times 2$

$v = 0 + 10$

$v = 10 \text{ m/s}^2$

Power = $\frac{\text{work done}}{\text{time}}$

$= \frac{1}{2} \times \frac{2 \times 10 \times 10}{2}$

$= 50 \text{ watts}$

114. Miscible liquid among the following is
(1) alcohol in water (2) milk (3) oil in water (4) kerosene in water

Ans. (1)

Sol. Alcohol in water is miscible due hydrogen bonding.

115. The number of atoms constituting a molecule is known as
(1) valency (2) atomicity (3) mole concept (4) atomic mass

Ans. (2)

Sol. The total number of atoms present in a molecule is known as atomicity.

116. Which of the following is an element ?
(1) Mercury (2) Ammonia (3) Water (4) Glucose

Ans. (1)

Sol. Element is a substance which contain only kind of particles.

117. The dyes of an ink can be separated by.....
(1) filtration (2) sublimation (3) fractional distillation (4) chromatography

Ans. (4)

Sol. Chromatography is a technique which used to separate the colourful substance from their constituents.

118. Molecular mass of H_2SO_4 is
(1) 58.5 (u) (2) 98 (u) (3) 36.5 (u) (4) 35.5 (u)

Ans. (2)

Sol. Atomic weight of H = 1u

$$\text{S} = 32 \text{ u}$$

$$\text{O} = 16 \text{ u.}$$

$$\text{Molecular weight of } \text{H}_2\text{SO}_4 = 2 \times 1 + 32 + 4 \times 16$$

$$= 2 + 32 + 64$$

$$= 98 \text{ u.}$$

119. The number of neutrons in an atom of ${}_{11}^{23}\text{X}$ is
(1) 23 (2) 11 (3) 34 (4) 12

Ans. (4)

Sol. Number of neutrons in an atom = Mass number – Atomic number.

$$= 23 - 11$$

$$= 12$$

120. The maximum number of electrons that can be accommodated in the 'L' shell of an atom is
(1) 2 (2) 4 (3) 8 (4) 16

Ans. (3)

Sol. Maximum number of electrons in any shell = $2n^2$

n = number of shell

maximum number of electrons in 'L'

$$\text{Shell} = 2 \times (2)^2$$

$$= 8$$

121. The isotope used in the treatment of cancer of
(1) Iodine (2) Cobalt (3) Carbon (4) Hydrogen

Ans. (2)

Sol. Co^{60} isotope of cobalt is used in treating the cancer.

122. Molecular formula of baking soda is

- (1) Na_2CO_3 (2) NaCl (3) NaHCO_3 (4) NaOH

Ans. (3)

Sol. Formula of baking soda is sodium hydrogen carbonate [NaHCO_3].

123. The quantum number which explain about size and energy of the orbit or shell is

- (1) Principle quantum number.
(2) Angular momentum quantum number.
(3) Magnetic quantum number.
(4) Spin quantum number.

Ans. (1)

Sol. Principle quantum number (n) related to number of shell explains about size and energy of orbit or shell.

124. The valency of the element with atomic number '10' is

- (1) 2 (2) 8 (3) 10 (4) 0

Ans. (4)

Sol. Atomic number 10 = Ne

Ne is a noble gas which does not combine any other element.

125. The impurity present in the ore is called

- (1) gangue (2) flux (3) slag (4) mineral

Ans. (1)

Sol. The impurity present in the ore is called gangue.

126. The allotrope of carbon in amorphous form among the following is

- (1) Diamond (2) Graphite (3) Buckminsterfullerene (4) Coal

Ans. (4)

Sol. Diamond, graphite and fullerene are crystalline form of carbon.

127. Choose the correct statement/statements from the following.

- (A) Blood is a substance which contains liquid particles.
(B) Lymph is the substance that contains blood without solid particles.
(C) Blood is a substance which contains solid and liquid particles.
(D) The liquid portion after formation of a blood clot is serum.

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

Ans. (4)

Sol. Blood is a substance which contains both liquid and solid particles, liquid i.e. plasma and solid particles like RBC, WBC, platelets.

Lymph contains a variety of substances including proteins, fats, water and while blood cells. Thus option (B) is incorrect because lymph also contains solid particles.

128. Which of the following are secondary metabolites ?

- (A) Carbohydrates (B) Tannins (C) Proteins (D) Gums

(E) Alkaloids

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

Ans. (4)

Sol. Secondary metabolites are organic compounds that are not directly involved in the normal growth, development or reproduction of an organism like tannins, gums and alkaloids.

129. Master gland is controlled by

- (1) Cerebellum (2) Cerebrum (3) Medulla (4) Diencephalon

Ans. (4)

Sol. Diencephalon contain hypothalamus which controls the master gland (pituitary gland).

130. One of the following is a mismatched pair.

- (1) Gibberellins-delaying dormancy in seeds.
(2) Ethylene-ripening of fruit.
(3) Auxins-cell elongation.
(4) Abscisic acid-closing of stomata.

Ans. (1)

Sol. Gibberellins break dormancy of seeds rather than delaying it.

131. An average Gestation period in Human beings is

- (1) 290 days (2) 280 days (3) 275 days (4) 300 days

Ans. (2)

Sol. Average gestation period in human beings is 40 weeks i.e. 280 days.

132. An embryo sac of flowering plant contains.....

- (1) Eight cells, Seven nuclei (2) Seven cells, Seven nuclei
(3) Seven cells, Eight nuclei (4) Eight cells, Eight nuclei

Ans. (3)

Sol. An embryo sac has seven cells (3 antipodals + 2 synergids + 1 egg cell + 1 central cell) and eight nuclei (central cell has 2 polar nuclei while all other cells have 1 nucleus).

133. Endosperm is

- (1) $2n$ (2) $3n$ (3) $4n$ (4) n

Ans. (2)

Sol. Endosperm is $3n$. Endosperm is formed by fusion of one sperm nucleus (n) with the polar nuclei ($2n$) in embryo sac.

134. Choose the correct statement/statements from the following.

- (A) Inter phase has three phases.
(B) Inter phase is the resting stage between two divisions.
(C) Inter phase is the period when genetic material makes its copy.
(D) Inter phase is the active phase between two divisions.

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

Ans. (4)

Sol. Interphase has three phases G_1 , S, G_2 . In the S phase cell duplicates its DNA. Originally interphase was called resting stage since light microscopy could not detect any activities taking place within the cells. Today however it is known as a stage of considerate activity at the molecular and sub cellular level.

135. Selective Permeability means

- (1) it allows entry of certain substances only.
- (2) it allows exit of certain substances only.
- (3) it allows passage of all solutes and solvents.
- (4) it allows entry and exit of certain substances and prevents remaining substances.

Ans. (4)

Sol. Selective permeable membrane allows only certain molecules to cross into and out of the cell.

136. In which of the following organs, cell division does not takes place ?

- (1) Bone marrow and Brain.
- (2) Fertilized egg and Bone marrow.
- (3) Cancer cells in different organs.
- (4) Brain and Heart.

Ans. (4)

Sol. Cell division does not take place in brain and heart.

137. The plants which having naked seeds.....

- (1) Bryophytes
- (2) Gymnosperms
- (3) Angiosperms
- (4) Thallophytes

Ans. (2)

Sol. Gymnosperms are seed bearing vascular plants such as Cycads, Conifers and Ginkgo. The word gymnosperm, means naked seeds.

138. The largest organ among the following.....

- (1) Liver
- (2) Stomach
- (3) Skin
- (4) Lungs

Ans. (3)

Sol. Largest organ among the given organs is skin.

139. Lenticels are found in

- (1) Leaves
- (2) Flowers
- (3) Roots
- (4) Stems

Ans. (4)

Sol. Lenticels are pores in the stem of a woody plant that allows gas exchange between the atmosphere and the internal tissues.

140. Anger is caused by increased levels of the following hormone.

- (1) Somatotropin
- (2) Thyroxine
- (3) Testosterone
- (4) Adrenaline

Ans. (4)

Sol. Anger is caused by increased levels of Adrenaline hormone.

141. The first term of a sequence is 2005. Each succeeding term is the sum of the cubes of the digits of the previous term. What is the 2005th term of the sequence ?

- (1) 29
- (2) 85
- (3) 250
- (4) 133

Ans. (3)

Sol. First term is 2005

$$\text{second term} = 2^3 + 0^3 + 0^3 + 5^3 = 133$$

$$\text{third term} = 1^3 + 3^3 + 3^3 = 55$$

$$\text{fourth term} = 5^3 + 5^3 = 250$$

$$\text{fifth term} = 2^3 + 5^3 + 0^3 = 133$$

Thus sequence is

2005, 133, 55, 250, 133, 55, 250, 133, 55, 250, 133

and so on.

From series it is clear 2005th term = 250

142. Suppose that

$$4^{x_1} = 5, 5^{x_2} = 6, 6^{x_3} = 7, \dots, 127^{x_{124}} = 128$$

what is $x_1 \cdot x_2 \cdot x_3 \cdot \dots \cdot x_{124}$?

- (1) 2 (2) $\frac{5}{2}$ (3) 3 (4) $\frac{7}{2}$

Ans. (4)

Sol. $4^{x_1} = 5, 5^{x_2} = 6, 6^{x_3} = 7, \dots, 127^{x_{124}} = 128$

Taking log on both sides

$$\log_4 5 = x_1, \log_5 6 = x_2, \log_6 7 = x_3, \dots, \log_{127} 128 = x_{124}$$

Multiplying all equations

$$\begin{aligned} x_1 \cdot x_2 \cdot x_3 \dots x_{124} &= \log_4 5 \cdot \log_5 6 \cdot \log_6 7 \dots \log_{127} 128 \\ &= \log_4 6 \log_6 7 \dots \log_{127} 128 \\ &= \log_4 128 \\ &= \log_4 (4^3 \times 2) \\ &= 3 + \log_2 2 \\ &= 3 + \frac{\log_2 2}{\log_2 2^2} = 3 + \frac{1}{2} \\ &= \frac{7}{2} \end{aligned}$$

143. Let a, b, c, d, e, f, g and h be distinct elements in the set $\{-7, -5, -3, -2, 2, 4, 6, 13\}$. What is the minimum possible value of $(a + b + c + d)^2 + (e + f + g + h)^2 = ?$

- (1) 30 (2) 32 (3) 34 (4) 40

Ans. (3)

Sol. Minimum value = $(13 - 7 + 4 - 5)^2 + (2 + 6 - 3 - 2)^2$
 $= 5^2 + 3^2$
 $= 25 + 9 = 34$

144. A positive integer n has 60 divisors and 7n has 80 divisors. What is the greatest integer k such that 7^k divides n?

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

Ans. (3)

Sol. n has 60 divisors

$$60 = 2 \times 30$$

$$= 3 \times 20$$

$$= 4 \times 15$$

$$= 5 \times 12$$

$$= 6 \times 10$$

If 7 is not factor of n $\Rightarrow 7n$ has 120 divisors.

but 7n has 80 divisors.

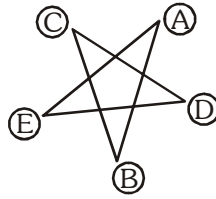
So, 7 is factor of n

$$\text{Now for } 7n = 4 \times 20 = 80$$

that 7n contains 7^3

& n contains $7^2 \Rightarrow k = 2$

- 145.** In the five-sided star shown, the letters A, B, C, D and E are replaced by the numbers 3, 5, 6, 7 and 9 although not necessarily in that order. The sums of the numbers at the ends of the line segments \overline{AB} , \overline{BC} , \overline{CD} , \overline{DE} and \overline{EA} form an arithmetic sequence although not necessarily in that order. What is the middle term of the arithmetic sequence ?



- (1) 9 (2) 10 (3) 11 (4) 12

Ans. (4)

Sol. Each corner (A, B, C, D, E) goes to two sides/numbers. (A goes to AE and AB, D goes to DC and DE). The sum of every term is equal to

$$2(3 + 5 + 6 + 7 + 9) = 60$$

Since the middle term in an arithmetic sequence is the average of all the terms in the sequence, the middle numbers

$$\text{is } \frac{60}{5} = 12.$$

- 146.** The sum of 49 consecutive integers is 7^5 , what their median ?

- (1) 7 (2) 7^3 (3) 7^2 (4) 7^4

Ans. (2)

Sol. Given the sum of 49 consecutive integers is 7^5 .

$$\therefore n + (n + 1) + (n + 2) + \dots + (n + 48) = 7^5$$

$$49n + (1 + 2 + 3 + \dots + 48) = 16807$$

$$49n + 1176 = 16807$$

$$49n = 15631$$

$$n = 319$$

\therefore consecutive integers are

319, 320, 321, 367

$$\text{Now median} = \text{middle term} = \left(\frac{49+1}{2} \right)^{\text{th}} \text{ term} = 25^{\text{th}} \text{ term} = 343 = 7^3$$

- 147.** The second and fourth terms of geometric sequence are 2 and 6. Which of the following is a possible first term ?

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

Ans. (2)

Sol. GP is a, ar, ar², ar³

$$\begin{array}{cc} \downarrow & \downarrow \\ 2 & 6 \end{array}$$

$$\frac{ar^3}{ar} = \frac{6}{2} \Rightarrow r^2 = 3$$

$$r = \pm \sqrt{3}$$

$$\therefore 3^{\text{rd}} \text{ term} = ar^2 = ar \times r = 2 \times \sqrt{3}$$

$$\therefore \text{sequence} = a, 2, 2\sqrt{3}, 6$$

or

$$a, 2, -2\sqrt{3}, 6$$

$$\therefore ar^2 = -2\sqrt{3} \quad \text{or} \quad ar^2 = +2\sqrt{3}$$

$$a = -\frac{2\sqrt{3}}{3}$$

$$a = \frac{2\sqrt{3}}{3}$$

148. What is the largest integer that is a divisor of $(n + 1)(n + 3)(n + 5)(n + 7)(n + 9)$ for all positive even integers n ?

(1) 3

(2) 5

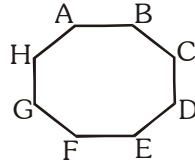
(3) 11

(4) 15

Ans. (4)

Sol. Given number is $(n + 1)(n + 3)(n + 5)(n + 7)(n + 9)$. Since n is even it is multiple of 5 consecutive odd numbers. Hence, it is divisible by 15.

149. A regular octagon ABCDEFGH has an area of one square unit. What is the area of the rectangle ABEF?



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

(2) $\frac{\sqrt{2}}{4}$

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

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

Ans. (4)

Sol. Area of regular octagon = 1

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

$$(\sqrt{2} + 1)a^2 = \frac{1}{2}$$

$$\text{Area of rectangle} = \frac{1}{2}$$

150. If $\log(xy^3) = 1$ and $\log(x^2y) = 1$, then $\log(xy) = ?$

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

(2) 0

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

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

Ans. (1)

Sol. $\log xy^3 = 1$

$\log x^2y = 1$

$$xy^3 = 10 \quad \dots(1)$$

$$x^2y = 10 \quad \dots(2)$$

On dividing

$$\frac{y^2}{x} = 1$$

$$x = y^2$$

from (1)

$$y^5 = 10$$

$$y = 10^{1/5}$$

$$x = 10^{2/5}$$

$$xy = 10^{3/5}$$

$$\log(xy) = \frac{3}{5}$$

151. If a, b, c, d are positive real numbers such that a, b, c, d form an increasing arithmetic sequence and a, b, d form a geometric sequence, then $\frac{a}{d}$ is

(1) $\frac{1}{12}$

(2) $\frac{1}{6}$

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

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

Ans. (3)

Sol. If a, b, c, d are in A.P. let with common diff. p then the seq. is a, a + p, a + 2p, a + 3p

Now,

$$a + d = a + a + 3p = 2(a + p) + p = 2b + b - a$$

$$a + d = 3b - a$$

$$\frac{2a + d}{3} = b$$

Now, a, b, d are in G. P.

$$\Rightarrow b^2 = ad$$

$$\left(\frac{2a + d}{3}\right)^2 = ad$$

$$4a^2 + d^2 + 4ad = 9ad$$

$$4a^2 + d^2 - 5ad = 0$$

$$a = d \text{ or } 4a = d$$

$$\frac{a}{d} = 1 \text{ or } \frac{a}{d} = \frac{1}{4}$$

152. The sum of 18 consecutive positive integers is a perfect square. The smallest possible value of this sum is ...

(1) 169

(2) 225

(3) 289

(4) 361

Ans. (2)

Sol. Acc. to question $n + (n + 1) + (n + 2) + \dots + (n + 17) = x^2$

$$18n + (1 + 2 + 3 + \dots + 17) = x^2$$

$$18n + \frac{17}{2} (2 + 16 \times 1) = x^2$$

$$18n + 17 \times 9 = x^2$$

$$18n + 153 = x^2$$

$$\text{Put } n = 4 \Rightarrow (18 \times 4) + 153 = 225$$

153. The mean, median, unique mode and range of a collection of eight integers are all equal to 8. The largest integer that can be an element of this collection is

(1) 11

(2) 12

(3) 13

(4) 14

Ans. (4)

Sol. Possible elements are :

4, 8, 8, 8, 8, 8, 8, 12

5, 7, 7, 8, 8, 8, 8, 13

6, 6, 6, 8, 8, 8, 8, 14

So largest integer can be 14

\therefore Option (4) is correct.

154. Let A, M and C be non-negative integers such that $A + M + C = 12$; what is the maximum value of $A \cdot M \cdot C + A \cdot M + M \cdot C + C \cdot A$?

- (1) 112 (2) 62 (3) 72 (4) 92

Ans. (1)

Sol. Here, $A + M + C = 12$

$\therefore A \cdot M \cdot C + A \cdot M + M \cdot C + C \cdot A$ is maximum only when $A = M = C = 4$

so, Maximum value of $A \cdot M \cdot C + A \cdot M + M \cdot C + C \cdot A$

$$\Rightarrow 4 \cdot 4 \cdot 4 + 4 \cdot 4 + 4 \cdot 4 + 4 \cdot 4$$

$$\Rightarrow 112$$

So, option (1) is correct

155. In triangle ABC, $3\sin A + 4\cos B = 6$ and $4\sin B + 3\cos A = 1$, then $\angle C$ in degrees is ...

- (1) 30 (2) 60 (3) 90 (4) 120

Ans. (1)

Sol. Here, $3\sin A + 4\cos B = 6$... (1)

$$4\sin B + 3\cos A = 1$$
 ... (2)

squaring and adding both equation, we get

$$(3\sin A + 4\cos B)^2 + (4\sin B + 3\cos A)^2 = 37$$

$$\Rightarrow 9 + 16 + 24(\sin A \cos B + \cos A \sin B) = 37$$

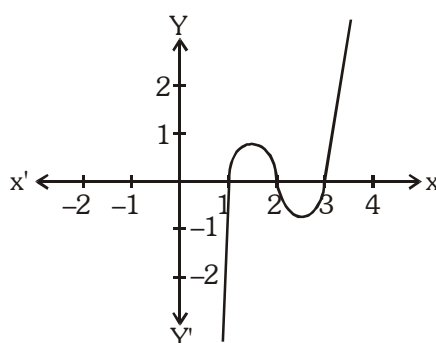
$$\Rightarrow \sin(A + B) = \frac{1}{2}$$

$$\therefore \angle(A + B) = 30^\circ \text{ or } 150^\circ$$

so, $\angle C = 150^\circ$ or 30°

\therefore Option (1) is correct.

156. The graph below represents a polynomial $p(x)$



Which of these is the remainder, when $p(x)$ is divided by the polynomial $x^2 - 5x + 6$?

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

Ans. (4)

Sol. $x^2 - 5x + 6 = x^2 - 3x - 2x + 6$

$$= x(x - 3) - 2(x - 3) = (x - 2)(x - 3)$$

Since, the given polynomial has 1, 2, 3 as zero's.

Hence, on dividing $p(x)$ by $x^2 - 5x + 6$ we get remainder 0

157. If $\log_{12} \sqrt{\log_2 \sqrt{x+2} - 2} = 0$, then x is equal to ...

(1) 34

(2) 16

(3) 8

(4) 12

Ans. (NA)

Sol. $\log_{12} \sqrt{\log_2 \sqrt{x+2} - 2} = 0$

$$12^0 = \sqrt{\log_2 \sqrt{x+2} - 2}$$

$$1 = \log_2 \sqrt{x+2} - 2$$

$$\log_2 \sqrt{x+2} = 3$$

$$2^3 = \sqrt{x+2}$$

$$8 = \sqrt{x+2}$$

$$x + 2 = 64$$

$$x = 62$$

158. $2^{3x} = 64^{-1}$ and $10y = 0.01$, then the value of $(50x)^{-1} (10y)^{-1}$ is ...

(1) 1

(2) -1

(3) 2

(4) -2

Ans. (2)

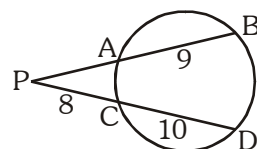
Sol. $2^{3x} = 2^{-6}$, $10y = \frac{1}{100}$

$$3x = -6, y = \frac{1}{1000}$$

$$x = -2$$

$$[50 \times (-2)]^{-1} \left(\frac{10}{1000} \right)^{-1} = \frac{-1}{100} \times 100 = -1$$

159. PAB, PCD are two secants. AB = 9 cm, PC = 8 cm and CD = 10 cm, then the length of tangent from P to the circle, will be...



(1) 7 cm

(2) 12 cm

(3) 14 cm

(4) 8 cm

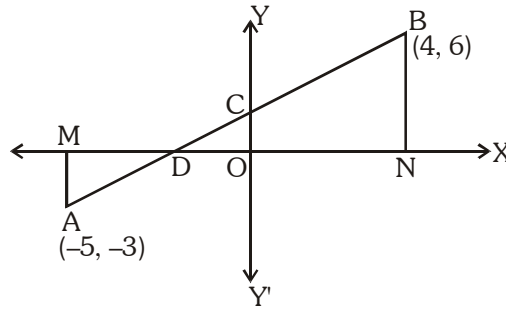
Ans. (2)

Sol. $PT^2 = 8 \times 18$

$$PT = \sqrt{8 \times 18}$$

$$= 2 \times 3 \times 2 = 12$$

- 160.** The join of A(-5, -3) and B(4, 6) intersects the X-axis at D and the Y-axis at C respectively. AM, BN are perpendiculars on the X-axis. Find the area ΔAMD : area ΔDCO .



- (1) 2 : 3 (2) 9 : 4 (3) 4 : 9 (4) 3 : 2

Ans. (2)

Sol. Equation of AB is $y + 3 = \frac{6+3}{4+5} (x + 5)$

$$y + 3 = \frac{9}{9} (x + 5)$$

$$x - y + 2 = 0$$

On X axis AB will intersect at (-2, 0)

On Y axis AB will intersect at (0, 2)

$$\frac{\text{or}(\Delta AMD)}{\text{or}(\Delta DCO)} = \frac{\frac{1}{2} \times 3 \times 3}{\frac{1}{2} \times 2 \times 2} = \frac{9}{4}$$

- 161.** Which of the following treaty recognised Greece as an Independent nation ?

- (1) Treaty of Vienna of 1815. (2) Treaty of Constantinople of 1832
(3) Treaty of Paris of 1783 (4) Treaty of Frankford of 1781

Ans. (2)

Sol. Treaty of Constantinople recognized Greece as an independent nation in 1832.

- 162.** In which year, was the "Tonkin Free School" established in Vietnam?

- (1) 1907 (2) 1917 (3) 1927 (4) 1937

Ans. (1)

Sol. Tonkin Free School was established in 1907.

- 163.** Who was the author of Hind Swaraj ?

- (1) Mahatma Gandhi (2) C.R. Das (3) Motilal Nehru (4) Jawahar Lai Nehru

Ans. (1)

Sol. Mahatma Gandhi wrote Hind Swaraj.

- 164.** Under whose presidency, the Lahore Congress formalised the demand of Turna Swaraj' or Full Independence for India ?

- (1) Motilal Nehru (2) Jawahar Lal Nehru (3) Vallabhai Patel (4) Pattabhi Sitaramaiah

Ans. (2)

Sol. It was under the leadership of Jawahar Lal Nehru, that INC demanded the Pura Swaraj or Complete Independence.

- 165.** United Nations Monetary and Financial Conference was held

- (1) July 1944 (2) June 1939 (3) September 1945 (4) March 1947

Ans. (1)

Sol. It was in July 1944, that the United Nations Monetary and Financial Conference was held.

166. The East India Company obtained Bombay from _____.
 (1) The Dutch (2) The Danes (3) The French (4) The Portuguese

Ans. (4)

Sol. Bombay was in the hands of Portuguese, who finally gave it to the East India Company.

167. What does the term "Suffrage" mean?
 (1) Right to Freedom (2) Right to Live (3) Right to Education (4) Right to Vote

Ans. (4)

Sol. When Right to Vote is given to all the adults it is called Universal Adult Suffrage.

168. Match list A with B and select the correct answer from the codes given below the lists.

(A)	(B)
(A) Kandukuri Veeresalingam	(i) Saudamini
(B) Ramshankar Ray	(ii) Manju ghosha
(C) Chandu Menon	(iii) Raja shekhara Charitam
(D) Srinivas Das	(iv) Indulekha
(E) Naro Sadashiv Risbud	(v) Pariksha Guru

Codes :

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

Ans. (2)

Sol. A. Kandukuri Veerasalingam - Rajashekhar Caritamu
 B. Ramshankar Ray - Saudimini
 C. Chandu Menon - Indulekha
 D. Srinivas Das - Pariksha Guru
 E. Naro Sadashiv Risbud - Manjughosha

169. The Governor-General who presecuted James Augustus Hickey for starting the Bengal Gazette, a weekly magazine was _____.

(1) Warren Hastings (2) Lord Cornwallis (3) Sir John Shore (4) Lord Wellesly

Ans. (1)

Sol. Hickey also published a lot of gossip about the Company's senior officials in India. Enraged by this, Governor-General Warren Hastings persecuted Hickey, and encouraged the publication of officially sanctioned newspapers that could counter the flow of information that damaged the image of the colonial government.

170. Who of the following was not one of the founders of the Khilafat Committee formed in the wake of the dismemberment of the Turkish empire which was perceived as undermining the position of the Sultan of Turkey (The Caliph) ?

(1) Mohammed Ali Jinnah (2) Maulana Shaukat Ali
 (3) Muhammed Ali (4) None of the above

Ans. (1)

Sol. Muhammad Ali and Shaukat Ali were the ones who formed the Khilafat Committee. Mohamamd Ali Jinnah was not at all associated with the formation.

171. As a result of the Poona Pact, the number of seats reserved for the depressed classes out of general electorate seats were _____.

(1) increased (2) decreased
 (3) retained at the same level (4) abolished

Ans. (3)

Sol. The British Government had earlier provided reservation of backward classes, and MK Gandhi was not happy with decision. Hence he started fast unto death, thus Poona Pact was signed between B.R Ambedkar and MK Gandhi which retained the reservations at the same level.

- 172.** Find the one which is not correct
- | | |
|-----------------------------------|------|
| (1) Civil Disobedience Movement | 1930 |
| (2) Gandhi-Irwin Pact | 1931 |
| (3) Second Round Table Conference | 1932 |
| (4) None of the above | 1932 |

Ans. (3)

Sol. Second Round Table Conference took place in 1931.

- 173.** Who abolished slavery in the French Colonies ?

- | | |
|--------------------------|------------------------|
| (1) Jacobins | (2) Napoleon Bonaparte |
| (3) Directory Government | (4) National Assembly |

Ans. (1)

Sol. Slavery was abolished in the French colonies by the Jacobins.

- 174.** "Kulaks" are _____.

- (1) Members of Duma
- (2) The wealthy peasants of Old Russia
- (3) The majority group of Russian Social Democratic Labour party
- (4) Small peasants

Ans. (2)

Sol. The wealthy peasants of Old Russia were known as "kulaks" .

- 175.** Who gave the slogan "One people, One empire and One vote" ?

- | | | | |
|------------|------------------------|-----------|----------------------|
| (1) Hitler | (2) Napoleon Bonaparte | (3) Lenin | (4) Benito Mussolini |
|------------|------------------------|-----------|----------------------|

Ans. (1)

Sol. This slogan was given by Hitler during the Nazi regime.

- 176.** Which of the following statement is correct ?

- (1) Over irrigation is responsible for land degradation in Punjab and Haryana.
- (2) Mining is responsible for land degradation in Jharkhand.
- (3) Over grazing is one of the main reason for land degradation in Maharashtra.
- (4) All the above.

Ans. (4)

Sol. All the above reasons are correct for land degradation in various states.

- 177.** Red soil develops on _____.

- | | | | |
|------------------|--------------------|---------------|--------------------------------|
| (1) Basalt rocks | (2) Dolomite rocks | (3) Limestone | (4) Crystalline igneous rocks. |
|------------------|--------------------|---------------|--------------------------------|

Ans. (4)

Sol. Red Soil develops on crystalline igneous rocks.

- 178.** Initially, Coffee cultivation was introduced on the _____

- | | | | |
|----------------------|----------------|--------------------|---------------------|
| (1) Baba Budan Hills | (2) Naga Hills | (3) Balaghat Range | (4) Nallamala Hills |
|----------------------|----------------|--------------------|---------------------|

Ans. (1)

Sol. Initially, coffee cultivation was introduced in Baba Budan Hills .

- 179.** Which of the following is not correctly matched ?

- | | |
|-------------------------------|----------------|
| (1) Bandavagarh National Park | Madhya Pradesh |
| (2) Periyar Tiger Reserve | Kerala |
| (3) Manas Tiger Reserve | Assam |
| (4) Buxa Tiger Reserve | Karnataka |

Ans. (4)

Sol. Buxa Tiger Reserve is located in West Bengal.

180. The largest solar energy plant is located at _____.

- (1) Manikarm in Himachal Pradesh (2) Madhapur in Bhuj
(3) Ramagundam in Telangana (4) Korba in Madhya Pradesh

Ans. (2)

Sol. The largest Solar Energy Plant is located in Madhapur in Bhuj, Gujarat.

181. Which one of the following minerals is formed by decomposition of rocks, leaving a residual mass of weathered material ?

- (1) Coal (2) Bauxite (3) Copper (4) Iron

Ans. (2)

Sol. The given characteristics match Bauxite.

182. Which of these is the largest producer of Jowar ?

- (1) Karnataka (2) Andhra Pradesh (3) Madhya Pradesh (4) Maharashtra

Ans. (4)

Sol. Presently, Maharashtra is the largest producer of Jowar in India.

183. Which one of the following minerals is contained in the Monazite sand ?

- (1) Lignite (2) Thorium (3) Barytes (4) Limestone

Ans. (2)

Sol. Kerala is famous for producing Thorium in Monazite sands.

184. Jute textiles are located mainly along the banks of the river Hugli. Which of these is not a reason for

- (1) Proximity of the jute producing areas
(2) Abundant sea water for processing raw jute
(3) In expensive water
(4) Cheap labour from West Bengal and adjoining states of Bihar and Orissa

Ans. (3)

Sol. Except option (3) all others are correct.

185. How many tonnes of Bauxite needed for the preparation 1 tonne of Aluminium ?

- (1) 2 to 4 tonnes (2) 2 to 6 tonnes (3) 4 to 6 tonnes (4) 6 to 8 tonnes

Ans. (3)

Sol. 4 to 6 tonnes of Bauxite are required to produce 1 tonne of Aluminium.

186. When was the Border Organisation established ?

- (1) 1955 (2) 1960 (3) 1965 (4) 1970

Ans. (2)

Sol. BRO was established in 1960.

187. Identify the rain shadow from the given areas.

- (1) Vishakapattanam (2) Pune (3) Karaikal (4) Chennai

Ans. (4)

Sol. Chennai receives less rain as it falls in the rain shadow region.

188. What is River Brahmaputra known as in Bangladesh ?

- (1) Tsang Po (2) Padma (3) Dihang (4) Jamuna

Ans. (1)

Sol. River Brahmaputra is called Tsang Po in Bangladesh.

189. Which is the youngest land in India ?

- (1) Northern Plains. (2) Himalayan Mountains
(3) Peninsular Plateau (3) Andaman and Nicobar islands

Ans. (2)

Sol. Himalayan Mountains are the youngest landmass in India.

190. "Duns" are formed in between _____

- (1) Greater Himalayas and lesser Himalayas (2) Lesser Himalayas and Sivaliks
(3) Sivaliks and Bhabur (4) Bhabur and Terai

Ans. (2)

Sol. It is between Lesser Himalayas and Shiwaliks, that "Duns" are formed.

191. The President of the World Bank has always been a citizen of the US, conventionally nominated by the _____.

- (1) UN Secretary General (2) Treasure Secretary General of the US Government
(3) Managing Director, International Monetary Fund (4) President of the European Union

Ans. (2)

Sol. The President of World Bank is nominated by the Treasure Secretary General of the US Government.

192. Which of the following statements is not correct ?

- (1) In Saudi Arabia, a woman does not have the right to vote.
(2) In Fiji, the electoral system is such that the vote of an indigenous Fiji has more value than that of an Indian - Fijian.
(3) In Mexico, during 1930-2000 elections, PRI (Institutional Revolutionary Party) has been winning through free and fair elections.
(4) None of the above.

Ans. (3)

Sol. PRI has been winning the elections, but has used many dirty tricks to win.

193. Using the codes given below the lists, match list A with list B and select the correct answer.

(A)			(B)		
(A) Garibi Hatao			(i) Slogan given by N.T. Rama Rao in 1983.		
(B) Save Democracy			(ii) Slogan given by Indira Gandhi in 1971.		
(C) Land to the tiller			(iii) Slogan given by Janata Party in 1977.		
(D) Protect the self respect of the Telugus			(iv) The left front used this slogan in 1977.		
(A)	(B)	(C)	(D)	(E)	
(1) (i)	(iii)	(i)	(iv)	(v)	
(2) (iii)	(i)	(iv)	(v)	(ii)	
(3) (iii)	(iv)	(ii)	(v)	(i)	
(4) (ii)	(i)	(iv)	(v)	(iii)	

Ans. (4)

Sol. As per the given match, Option (4) stands correct.

194. "Kittiko-Hachchiko" movement took place in this state.

- (1) Karnataka (2) Uttarakhand (3) West Bengal (4) Rajasthan

Ans. (1)

Sol. This movement took place in Karnataka.

195. Which of the following is not an instance of an exercise of a fundamental right ?

- (1) Men and women government employees get the same salary.
(2) Parents' property is inherited by their children.
(3) Christian Missionaries set up a chain of missionary schools.
(4) Workers from Telangana go to Maharashtra to work on the farms.

Ans. (2)

Sol. Parent's property cannot be inherited by children, as Right to Property is a legal right and not a Fundamental Right.

196. Find the one that is wrongly matched.

- | | |
|---|------|
| (1) Prime Minister Rozgar Yojana | 1993 |
| (2) Pradhanamantri Gramodaya Yojana | 2000 |
| (3) Mahatma Gandhi Rural Employment Guarantee Act | 2005 |
| (4) Swarna Jayanti Gram Swarozgar Yojana | 2009 |

Ans. (4)

Sol. Swarnajayanti Gram Swarozgar Yojana (SGSY) was launched in 1999.

197. Which among the following groups had the highest poverty during 2011-12?

- | | |
|----------------------|----------------------------|
| (1) Schedule Castes | (2) Agricultural Labourers |
| (3) Casual Labourers | (4) Urban Labourers |

Ans. (2)

Sol. Agricultural labourers had the highest poverty during 2011-12, i.e 39%(approx.)

198. Who avail benefits under Antyodaya Anna Yojana ?

- | | |
|------------------------------|---------------------|
| (1) Indigent Senior citizens | (2) Backward blocks |
| (3) Poorest of the poor | (4) All the above |

Ans. (3)

Sol. Antyodaya Anna Yojana benefits poorest of the poor.

199. Which of the following neighbouring countries has better performance in terms of life expectancy at birth than India ?

- | | | | |
|--------------|-----------|-------------|--------------|
| (1) Pakistan | (2) Nepal | (3) Myanmar | (4) Srilanka |
|--------------|-----------|-------------|--------------|

Ans. (4)

Sol. Sri Lanka has better performance in terms of life expectancy than India.

200. The founder of "Grameen Bank of Bangladesh" is _____.

- | | |
|------------------------------|------------------------------|
| (1) Professor Mohammad Yunus | (2) Khaleda Zia |
| (3) Sheik Mujibur Rahman | (4) Maulana Abdul Hamid Khan |

Ans. (1)

Sol. Professor Mohammad Yunus founded the Grameen Bank of Bangladesh.
