Date: 03/11/2019

Max. Marks: 100   **SOLUTIONS**   **Time allowed: 120 mins**

1.   Slavery was finally abolished in French colonies in _____.
  (1) 1848   (2) 1815   (3) 1804   (4) 1884
Ans. *(1)*

2.   Put the following events in sequence.
  (i) Return of Lenin   (ii) October Revolution   (iii) Russian peace with Germany
  (iv) February Revolution   (v) Centralised Planning
  (1) I, III, IV, V, II   (2) iv, i, ii, iii, v   (3) iv, ii, i, iii, v   (4) ii, v, i, iii, v
Ans. *(2)*

3.   Name the minister of Propaganda under the Hitler Rule.
  (1) Joseph Goebbels   (2) Hindenburg   (3) Hjalmar Schacht   (4) Ernest Heimer
Ans. *(1)*

4.   Name the axis powers in second world
  (1) Germany, Italy, Japan   (2) Germany, Austria, Prussia
  (3) Germany, Austria, Russia   (4) Germany, Japan, Russia
Ans. *(1)*

5.   Consider the following Indian leaders.
  i. Motilal Nehru   ii. Dada Bhai Naoroji   iii. Raja Ram Mohan Roy   iv. Mahatma Gandhi
  The correct Chronological order in which they appeared on national scene is
  (1) i, ii, iii, iv   (2) iv, iii, ii, i   (3) iii, ii, i, iv   (4) ii, i, iii, iv
Ans. *(3)*

6.   Who founded SATYA SHODHAK SAMAJ.
  (1) Jyotiba Phule   (2) Raja Ram Mohan Roy   (3) Swami Vivekanand   (4) Swami Dayanand
Ans. *(1)*

7.   Which of the following picture was page of music book by E.T. Paul
  (1) Dawn of century   (2) Dawn of industrial age   (3) Dawn of Agricultural age   (4) Dawn of 21st Century
Ans. *(1)*

8.   Choose the correct statements:
  i. The Zollverein was formed in 1834
  ii. It abolished tariff barriers.
  iii. It reduced the number of currencies from thirty to one
  iv. it was initiative of Prussia and joined by all German states
  (1) i, ii, iii, iv   (2) ii and iii   (3) i, ii and iv   (4) ii, iii and iv
Ans. *(3)*

9.   The people gathered In Jallianwala Bagh to protest against the arrest of two leaders They were_____
  (1) Bhagat Singh and Dr. Satyapal   (2) Bhagat Singh and Rajguru
  (3) Dr. Saifuddin Kitchlu and Mahatma Gandhi   (4) Dr. Saifuddin Kitchlu and Dr. Satyapal
Ans. *(4)*

10. The national assembly of France voted in April 1792 to declare war against _____.

(1) Germany and Austria   (2) Germany and England

(3) Prussia and England   (4) Prussia and Austria

Ans. *(4)*

11. Out of 250 members of Rajya Sabha, how many members are nominated by president.

(1) 11   (2) 10   (3) 14   (4) 12

Ans. *(4)*

12. Which article in Indian Constitution stipulates that there shall be Vice- President of India

(1) Article 63   (2) Article 65   (3) Article 66   (4) Article 62

Ans. *(1)*

13. Point out the difference between the local government in India before and after the Constitutional amendment in 1992.

i. it became mandatory to hold regular elections to the focal government bodies.

ii. one third positions reserved for women

iii. Elected officials exercise supreme power in the government.

(1) Only i   (2) i and ii   (3) i, ii and iii   (4) ii and iii

Ans. *(2)*

14. When did the civil rights movement take place in USA

(1) 1953 – 1958   (2) 1954 – 1968   (3) 1960 – 1970   (4) 1946 – 1978

Ans. *(2)*

15. When was Bhartiya Janta Party formed?

(1) 10th April, 1975   (2) 6th April, 1970   (3) 6th April, 1980   (4) 10th April, l985

Ans. *(3)*

16. In the context of democracies, what is successfully done by democracies?

(1) Eliminated conflicts among people

(2) Eliminated economic inequalities among people

(3) Eliminated differences of opinion about how marginalized actions are to be treated.

(4) Rejected the idea of political inequality

Ans. *(4)*

17. Who passed "Legal Frame work Order 2002" ?

(1) Zanu   (2) Robert Mugabe   (3) General M usharraf   (4) Allende

Ans. *(3)*

18. Select the right combination of subjects under union list.

(1) Defence, Atomic energy, Post and telegraphs, war and peace

(2) Railways, Land, Trade, Police

(3) Education, Agricultural land, Trade, Defence

(4) Cyber laws, Adoption, Trade, Forests

Ans. *(1)*

19. Which one of the following countries was the first one to grant Universal Suffrage?

(1) Russia   (2) Germany   (3) New Zealand   (4) The Netherland

Ans. *(3)*

20. Which of the following is working capital ?

(1) Electricity bill   (2) Tube well   (3) Tractor   (4) Machines

Ans. *(1)*

21. Coins in India are minted by _____

(1) Ministry of Finance, Government of India (2) Reserve Bank of India

(3) State Bank of India (4) Central Bank of India

Ans. *(1)*

22. What should be included in national Income by expenditure method

i. Self-produced final product

ii. Expenditure on second hand goods

iii. Expenditure on shares i

iv. Expenditure on intermediate goods

(1) ii, iii, iv (2) i and ii (3) i only (iv) iii and iv

Ans. *(3)*

23. What is the definition of overweight??

(1) BMI > 25 kg/m^2 (2) BMI = 25kg/m^2 (3) BMI = 25-29.9 kg/m^2 (4) BMI = 25-30 kg/m^2

Ans. *(1)*

24. Name one of the following Agency that develops standards for goods and services.

(1) COPRA (2) National Consumer forum

(3) Consumer protection council (4) Bureau of Indian Standards

Ans. *(4)*

25. National Food For Work Program launched in _____.

(1) 2003 (2) 2001 (3) 2004 (4) 2005

Ans. *(3)*

26. Which of the following countries has poor natural resources but rich human resources?

(1) India (2) Nepal (3) Japan (4) Sri Lanka

Ans. *(3)*

27. What is the Gross National Product?

(1) The total value of Goods and services manufactured in the country

(2) The total value of all the transactions in the country

(3) Reduction in the total value of goods and services produced in the country

(4) The total worth of goods and services generated in the country and net factor income from abroad.

Ans. *(4)*

28. Which one of the following is an incorrect fact regarding south India.

(1) Diurnal range of temperature is less

(2) Annual range of temperature is less

(3) Temperatures are high throughout the year.

(4) Extreme climatic conditions are found here.

Ans. *(4)*

29. Read the two statements A and B and choose the best answer.

A. Assertion: Petrochemical Industry is a fast-growing Industry.

B. Reason: Synthetic rubber, plastics, insecticides etc are the products of Petro chemical industry

(1) A and B both are correct and B explains A

(2) A and B are both correct but B does not explain A

(3) A is correct but B is incorrect

(4) A and B are both incorrect

Ans. *(1)*

30. The process of "Retting" is associated with which of the following?

(1) Tea (2) coffee (3) Jute (4) Rubber

Ans. *(3)*

31. The "Golden Quadrilateral" which connects Delhi-Mumbai-Chennai-and Kolkata passes through ....
(1) AMRITSAR - AHMEDABAD - PUNE - PATNA
(2) JAIPUR - PORBANDER - HYDERABAD - VARANASI
(3) VADODARA - PUNE - VISHAKHAPATNAM - VARANASI
(4) NAGPUR - BHOPAL - SURAT - AMRITSAR
Ans. *(3)*

32. The Narmada river In the Peninsular plateau flows westward with a remarkably straight channel. It is because ____
(1) Slope gradient in this part controls the over channel pattern
(2) River carries huge amount of water which has created straight channel course
(3) River forms the boundary between central highlands and the Deccan Plateau
(4) River flows through the trough of a rift valley inclined westward
Ans. *(4)*

33. If it is 12 noon in a city located on 90° W longitude, what would be time in a city located on 105° W longitude
(1) 13:00   (2) 12:30   (3) 11:30   (4) 11:00
Ans. *(4)*

34. Iron ore from kudermukh is most likely to be exported through
(1) Goa   (2) Kochi   (3) Mangalore   (4) Ennore
Ans. *(3)*

35. Marble is a type of _____ rock.
(1) Sedimentary   (2) Metamorphic   (3) Basalt   (4) Igneous
Ans. *(2)*

36. Match the following

i.	Iron	a.	Digbio
ii.	Coal	b.	Singhbhum
iii.	Manganese	c.	Balaghat
iv.	Oil	d.	Ranlganj

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

37. Which of the following is found on foothills and river valley placer deposits:
(1) lead   (2) gypsum   (3) bauxite   (4) gold
Ans. *(4)*

38. Choose the false statement among the following statements:
(1) The southwest monsoon is a continuation of the southeast trade wind, deflected towards the Indian subcontinent after crossing the equator.
(2) In winter, India is under the influence of North West monsoon due to westerly jet stream
(3) The southwest monsoon sets in over the Kerala coast by 1st June.
(4) The shift in the position of the ITCZ is related to the phenomena of the withdrawal of the westerly jet stream from its position over the north Indian plain.
Ans. *(4)*

39. Aus, Aman and Boro, grown thrice in a year are types of _____ crops.
(1) Maize   (2) Rice   (3) Millets   (4) Wheat
Ans. *(2)*

40. Which of the following is the type of plate boundary of Indian plate along Himalayan mountains?
(1) Ocean-Continent Convergence   (2) Divergent boundary
(3) Transform boundary   (4) Continent -continent convergence
Ans. *(4)*

41. The process of formation of seed without the act of fertilization is known as:

(1) Parthenogenesis   (2) Spoliation   (3) Apomixis   (4) Vegetative reproduction

Ans. *(3)*

Sol. Apormixis is a reproductive mechanism that allows a plant to clone itself through seed.

42. If the tip of sugarcane plant is removed from the field, even then it keeps on growing in length, it is due to the presence of:

(1) Cambium   (2) Apical Meristem   (3) Lateral Meristem   (4) Intercalary Meristem

Ans. *(4)*

Sol. Intercalary meristems are located at the nodes which help in increasing the length of the stem of plant.

43. Which among the following has specialized tissue for conduction of water:

(i) Thallophyta   (ii) Bryophyta   (iii) Pteridophyta   (iv) Gymnosperms

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

Ans. *(3)*

Sol. Pteridophytes, gymnosperms and angiosperms are vascular plants and have tissues for the conduction of water and food.

44. If pepsin is lacking in gastric juice then which of the following event in stomach will be affected:

(1) Digestion of starch into sugars   (2) Digestion of fats into glycerol and fatty acids

(3) Digestion of Nucleicacids   (4) Digestion of proteins into peptides

Ans. *(4)*

**Sol.** Pepsin is an enzyme involved in protein digestion.

45. Colourblindness is more common in males than in females due to:

(1) Dominant gene of such trait lies on Y chromosome

(2) Dominant gene of such trait lies on X chromosome

(3) Recessive gene lies on X chromosome

(4) Recessive gene lies on Y chromosome

Ans. *(3)*

Sol. Colorblindness is X-linked recessive disorder and it is more common in males due to only one X-chromosome in males.

46. Three cylinders each closed by a membrane permeable to water and containing a different fluid are placed in same solution. After adjusting to solution the fluid rises in one of the cylinder, remains the same in another and falls in the third. What is the concentration of the solution in which cylinders have been placed:
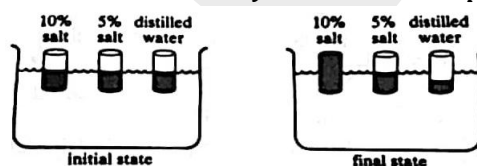
(1) 0% satt solution   (2) 2.5% salt solution   (3) 5% salt solution   (4) 10% salt solution

Ans. *(3)*

Sol. There is no net movement in case of isotonic solutions if concentration of solution is 5% as there is no movement in that case.

47. Mitochondria and chloroplast are:

(i) Semiautonomous organelles

(ii) Formed by division of pre existing organelles and the contain DNA but lack protein synthesizing machinery.

Which one of the following option is correct:

(1) Both (i) and (ii) are correct   (2) (ii) is true, (i) is false

(3) (i) is true but (ii) is false   (4) Both (i) and (ii) are false

Ans. *(3)*

Sol. Mitochondria and chloroplast are semi-autonomous organelles due to presence of their own DNA and ribosomes and these are capable of making proteins themselves.

48. Climbers grow towards and around support is an example of:

(1) Hydrotropism   (2) Geotropism   (3) Haptotropism   (4) Phototropism

Ans. *(3)*

Sol. Haptotropism is a process of movement of parts of a plant in response to a touch stimulus.

49. Which of the following statement about transmission of nerve impulse is incorrect:

(1) Nerve impulse travels from dendritic end towards axonal end

(2) At the dendritic end electrical impulses bring about the release of some chemicals which generate an electrical impulse at the axonal end of another neuron

(3) The chemicals released from axonal end of one neuron cross the synapse and generate a similar impulse in a dendrite of another neuron

(4) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cell

Ans. *(2)*

Sol. At the axanol end, some chemicals are released in a neuron, which genarate an electrical impulse at the dendritic end of another neuron.

50. Which of the following is an example of homologous organs?

(1) Wings of a bat and a butterfly   (2) Wings of a bird and a bat

(3) Wings of pigeon and a butterfly   (4) Forelimbs of cow and lizard

Ans. *(4)*

Sol. Homologous organs are the organs which are similar in structure but perform different functions.

51. As we travel along the food chain, the concentration of DDT

(1) Increases   (2) Remains constant   (3) Decreases   (4) Fluctuate randomly

Ans. *(1)*

Sol. Biomagnifications is increase in concentration of a substance, such as toxic chemical, in the body of an organisms at successively higher trophic levels in a food chain.

52. Which among the following statements are true for unisexual flowers?

(i) They possess both stamens and carpel

(ii) They possess either stamen or carpel

(iii) They exhibit cross pollination

(iv) Unisexual flowers possessing only stamens cannot produce fruits

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

Ans. *(2)*

Sol. Unisexual flowers are flowers that possesses either stamens or carpels and exhibit cross pollination.

53. Lack of oxygen in muscles often leads to cramps among cricketers. This is due to:

(1) Conversion of pyruvate to lactic acid   (2) Conversion of pyruvate to glucose

(3) Non-conversion of glucose to pyruvate   (4) Conversion of pyruvate to ethanol

Ans. *(1)*

Sol. Due to absence or insufficient amount of oxygen while playing glucose is not completely dissociated into CO_2 and H_2O. Due to this pyruvate converts into lactic acid and often leads to cramps.

**54.** Choose the correct path of urine in our body:

(1) Kidney $\rightarrow$ Ureter $\rightarrow$ Urinary bladder $\rightarrow$ Urethra   (2) Kidney $\rightarrow$ Ureter $\rightarrow$ Urethra $\rightarrow$ Urinary bladder

(3) Kidney $\rightarrow$ Urinary bladder $\rightarrow$ Urethra $\rightarrow$ Ureter   (4) Urinary bladder $\rightarrow$ Kidneys $\rightarrow$ Ureter $\rightarrow$ Urethra

Ans. *(1)*

Sol. Passage of urine in our body is from kidneys $\rightarrow$ Ureters $\rightarrow$ Urinary bladder $\rightarrow$ Urethra

55. The area of the Blades of the magnetic compass as shown in figure will be: (Take $\sqrt{11} = 3.32$)
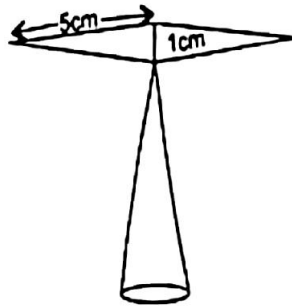
(1) $9\ cm^2$ (2) $5.58\ cm^2$ (3) $11\ cm^2$ (4) $4.98\ cm^2$

Ans. *(4)*

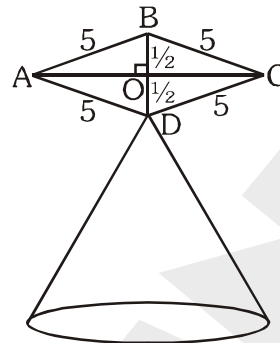**Sol.** $OA = \sqrt{25 - \dfrac{1}{4}} = \sqrt{\dfrac{99}{4}} = \dfrac{3\sqrt{11}}{2}$

$AC = 3\sqrt{11}$

$BD = 1$

Rhombus ABCD

area $= \dfrac{1}{2}d_1 d_2 = \dfrac{1}{2} \times 1 \times 3\sqrt{11}$

$\qquad = \dfrac{3}{2}\sqrt{11} = \dfrac{3}{2} \times 3.32 = \dfrac{9.96}{2} = 4.98$

56. By selling 12 oranges for a rupee; a man losses 20%. How many for a rupee should he sell to gain 20%:

(1) Rs.15   (2) Rs.10   (3) Rs.8   (4) Rs. 5

Ans. *(3)*

Sol. S.P. of one orange $= \dfrac{1}{12}$

$CP = \dfrac{1 \times 100}{12 \times (100 - 20)} = \dfrac{5}{48}$

New SP $= \dfrac{5}{48} \times \dfrac{120}{100} = \dfrac{1}{8}$

$\therefore$ New SP of one orange $=$ Rs. $\dfrac{1}{8}$

$\therefore$ No. of orange of Rs. $1 = 8$

57. In an Arithmetic Progression, the sum of first 'n' terms is $\dfrac{3n^2}{2} + \dfrac{5n}{2}$. Then the 25th term will be:

(1) 4   (2) 3   (3) –4   (4) 3.5

Ans. *(Bonus)*

Sol. $S_n = \dfrac{3n^2}{2} + \dfrac{5n}{2}$

$S_1 = a = 4$

$S_2 = 2a + d = 6 + 5 = 11, \qquad a_1 + a_2 = 11,\ a_2 = 7, d = 3$

$T_{25} = a + 24d = 4 + 72 = 76$

58. Probability that a leap year selected at random will contain 53 Sunday is:

(1) 2/7   (2) $\dfrac{53}{365}$ (3) 1/7   (4) $\dfrac{7}{365}$

Ans. (1)

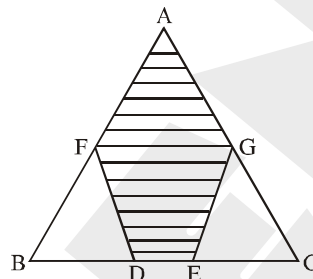**Sol.** $\dfrac{366}{7} = 52\dfrac{2}{7}$

= 2/7

59. If $A + B = 90°$ then $\dfrac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \dfrac{\sin^2 B}{\cos^2 A}$

(1) $\cot^2 A$ (2) $\cot^2 B$ (3) $-\tan^2 A$ (4) $-\cot^2 A$

Ans. (2)

Sol. $\dfrac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \dfrac{\sin^2 B}{\cos^2 A} = \dfrac{\tan A \cot A + \tan^2 A}{\sin A \operatorname{cosec} A} - \dfrac{\cos^2 A}{\cos^2 A} = 1 + \tan^2 A - 1 = \tan^2 A = \cot^2 B$

$\left(\angle B = 90 - \angle A\right)$

60. $\triangle ABC$ is an Equilateral triangle. We have BD = EG = DF = DE = EC; then the ratio of the area of the shaded portion to the area of $\triangle ABC$ is:

(1) $\dfrac{4}{11}$ (2) $\dfrac{7}{9}$ (3) $\dfrac{5}{12}$ (4) $\dfrac{6}{7}$
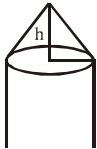
Ans. (2)

Sol.
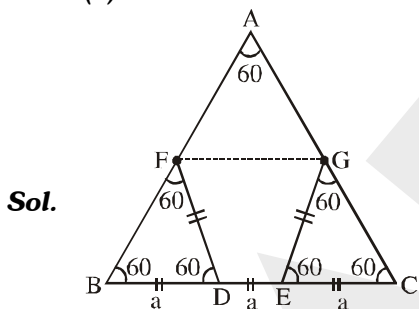
$\operatorname{ar}(ABC) = \dfrac{(3a)^2 \sqrt{3}}{4} = \dfrac{9\sqrt{3}}{4}a^2$

$\operatorname{ar}(\text{shaded}) = \dfrac{9\sqrt{3}}{4}a^2 - \dfrac{a^2\sqrt{3}}{4} - \dfrac{a^2\sqrt{3}}{4}$

$= \dfrac{9\sqrt{3}}{4}a^2 - \dfrac{2a^2\sqrt{3}}{4}$

$= \dfrac{7a^2\sqrt{3}}{4}$,   Ratio = $\dfrac{\dfrac{7a^2\sqrt{3}}{4}}{\dfrac{9a^2\sqrt{3}}{4}} = \dfrac{7}{9}$

61. A solid consists of a rectangular cylinder with an exact fitting right circular cone placed on the top. Height of the cone is 'h' If total volume of the solid is three times the volume of the cone, then the height of the circular cylinder is:

(1) $\dfrac{2h}{9}$ (2) $\dfrac{2h}{3}$ (3) $\dfrac{3h}{2}$ (4) $\dfrac{4h}{3}$

Ans. (2)

Sol.

$$\pi R^2 H + \frac{1}{3}\pi R^2 h = 3 \times \frac{1}{3}\pi R^2 h$$

$$\pi R^2 H = \frac{2}{3}\pi R^2 h$$

h = 3/2 H,   **H = 2/3 h**

62. As aeroplane is flying horizontal at a height of 3150 m above horizontal plane ground. At a particular instant, it passes another plane Vertically below it. At this instant, the angles of elevation of the planes form a point on the ground are 30° and 60°. Hence distance between the two planes at that instant is

(1) 1050 m   (2) 2100 m   (3) 4200 m   (4) 5250 m

Ans. (2)
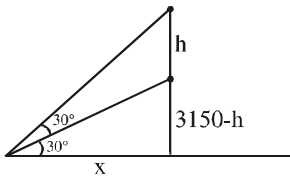
Sol.

$$\tan 30° = \frac{1}{\sqrt{3}} = \frac{3150 - h}{x}, \qquad\qquad \tan 60° = \sqrt{3} = \frac{3150}{x}$$

$$(3150 - h)\sqrt{3} = \frac{3150}{\sqrt{3}}, \qquad\qquad 3(3150 - h) = 3150$$

$$3h = 2 \times 3150$$
$$h = 2 \times 1050$$
$$h = 2100$$

63. The compound interest is Rs.6.40 more than the simple interest. If a sum is lent for 2 years at 8% compound interest. The sum will be:

(1) Rs.1800   (2) Rs. 10,000   (3) Rs.800   (4) Rs. 1000

Ans. (4)

Sol. $$P\left(1 + \frac{R}{100}\right)^n - P = 6.4 + \frac{PRT}{100}$$

$$P\left(1 + \frac{8}{100}\right)^2 - P = \frac{64}{10} + \frac{8 \times 2}{100}P$$

$$P(1.08)^2 - P = 6.4 + 0.16P$$

$$P\left((1.08)^2 - 1 - 0.16\right) = 6.4 \qquad\qquad P = \frac{6.4}{.0064} = 1000$$

64. If a, b, c, d and *e* are in continous proportion, then a/e is equal to

(1) $\dfrac{a^3}{b^3}$ (2) $\dfrac{a^4}{b^4}$ (3) $\dfrac{b^3}{a^3}$ (4) $\dfrac{b^4}{a^4}$

Ans. (2)

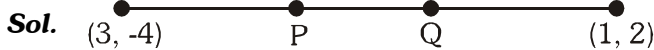**Sol.** $\dfrac{a}{b} = \dfrac{b}{c} = \dfrac{c}{d} = \dfrac{d}{e} = k$

a = bk, b = ck, c = dk, d = ek

$\Rightarrow$ a = ck² = dk³ = ek⁴

$\dfrac{a}{e} = k^4 = \dfrac{a^4}{b^4}$

65. The line segment Joining the points (3, -4) and (1,2) is trisected at the points P & Q. If the coordinates of P & Q are $(p, -2)$ & $\left(\dfrac{5}{3}, q\right)$ respectively. Find the values of p & q.

(1) $p = 0, q = \dfrac{7}{3}$ (2) $p = \dfrac{7}{3}, q = 0$ (3) p = 7, q = 3   (4) p = 3, q = 7
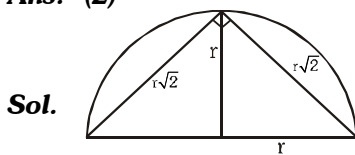
Ans. (2)

Sol.

(3, -4)   P   Q   (1, 2)

$P\left(\dfrac{1+6}{3}, \dfrac{2-8}{3}\right)$ $P = \left(\dfrac{7}{3}, -2\right)$ p = 7/3

$Q\left(\dfrac{2+3}{3}, \dfrac{4-4}{3}\right)$ $Q = \left(\dfrac{5}{3}, 0\right)$ q = 0

66. What will be the area of largest triangle that can be inscribed in the semicircle of radius $\dfrac{'r'}{16}$

(1) $16r^2$ (2) $\dfrac{r^2}{256}$ (3) $\dfrac{r^2}{64}$ (4) $\dfrac{r^2}{32}$

Ans. (2)

Sol.

$A = \dfrac{1}{2} \times r\sqrt{2} \times r\sqrt{2} = r^2$

$\left(\dfrac{r}{16}\right)^2 = \dfrac{r^2}{256}$

67. If x + y + z = 0 & $x \neq 0, y \neq 0, z \neq 0$, then the value of $\dfrac{x^2}{yz} + \dfrac{y^2}{xz} + \dfrac{z^2}{xy}$ is ?

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

Ans. (4)

Sol. $x + y + z = 0$, $\dfrac{x^3 + y^3 + z^3}{xyz} = 3$

68. If $x^2 + y^2 + z^2 = r^2$ where, x = rcos a cos b, y = r cos a sin b then z has one of the following values:

(1) r cos a   (2) r tan a cos b   (3) r tan a tan b   (4) r sin a

Ans. *(4)*

Sol. $x^2 + y^2 + z^2 = r^2$

$r^2 \cos^2 a \cos^2 b + r^2 \cos^2 a \sin^2 b + z^2 = r^2$

$r^2 \cos^2 a + z^2 = r^2 \qquad\qquad z^2 = r^2 - r^2 \cos^2 a$

$\qquad\qquad\qquad\qquad\qquad\qquad = r^2 \sin^2 a$

$\qquad\qquad\qquad\qquad\qquad z = r \sin a$

69. If α & β are the roots of the equation $3x^2 - 5x + 3 = 0$ then the quadratic equation whose roots are $\alpha^2\beta$ and $\alpha\beta^2$ is

(1) $3x^2 - 5x + 3 = 0$ (2) $3x^2 - 8x + 5 = 0$ (3) $3x^2 - 8x + 3 = 0$ (4) $3x^2 - 5x - 3 = 0$

Ans. *(1)*

Sol. $\alpha + \beta = \dfrac{5}{3}$

$\alpha\beta = 1$

$x^2 - x\left(\alpha^2\beta + \alpha\beta^2\right) + \alpha^3\beta^3 = 0$

$x^2 - x(\alpha\beta)(\alpha + \beta) + \alpha^3\beta^3 = 0$

$x^2 - x\left(\dfrac{5}{3}\right) + 1 = 0$

$3x^2 - 5x + 3 = 0$

70. The sum of length, breadth and height of cuboid is 19 m, its diagonal is $5\sqrt{5}$ m long. Its surface area is

(1) $286\,m^2$ (2) $236\,m^2$ (3) $226\,m^2$ (4) $256\,m^2$

Ans. *(2)*

Sol. l + b + h = 19

$l^2 + b^2 + h^2 = 125$

T.S.A = 2(lb + bh + lh)

$(l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + lh)$

$361 = 125 + 2(lb + bh + lh)$
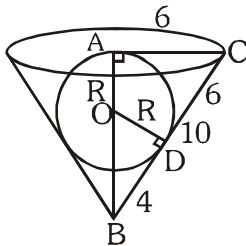
T.S.A = 236

71. A conical vessel of radius 6 m and height 8 m is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the side, it is just completely immersed. What fraction of water over flowed?

(1) 5/8   (2) 3/4   (3) 3/8   (4) 5/4
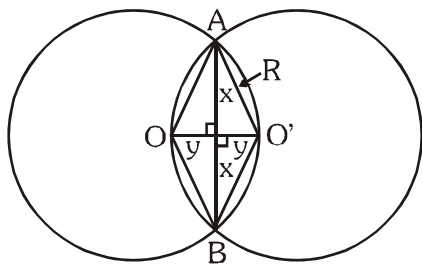
Ans. *(3)*

Sol.

$\Delta BAC \sim \Delta BDO$

$\therefore \dfrac{R}{6} = \dfrac{4}{8}, R = 3$

$$\frac{\text{Volume of sphere}}{\text{Volume of cone}} = \frac{\dfrac{4}{3}\pi R^3}{\dfrac{1}{3}\pi(6)^2 \times 8}$$

$$= \frac{4 \times 3^3}{36 \times 8}$$

$$= \frac{27}{36 \times 2} = \frac{3}{8}$$

72. If a, b, c are the sides of right triangle where c is the hypotenuse, then radius of the circle which touches the sides of the triangle is

(1) $\dfrac{a+b+c}{2}$ (2) $\dfrac{a+c-b}{2}$ (3) $\dfrac{a+b-c}{2}$ (4) $\dfrac{b+c-a}{2}$

Ans. *(3)*

Sol.

$b - R + a - R = c$

$\therefore\ R = \dfrac{b+a-c}{2}$

73. $\triangle ABC$ is right angled at B, AD, CE are the two medians drawn from A and C respectively. If $AD = \dfrac{3\sqrt{5}}{2}$, $CE = 2\sqrt{5}$.

The value of AC will be

(1) 13 (2) 5 (3) $12\sqrt{5}$ (4) 12

Ans. *(2)*

Sol.

$4y^2 + x^2 = \dfrac{45}{4}$

$4x^2 + y^2 = 20$

$\overline{5(x^2 + y^2) = \dfrac{125}{4}}$

$x^2 + y^2 = \dfrac{25}{4}$

$4x^2 + 4y^2 = AC^2 \ \Rightarrow\ AC^2 = 25$

$AC = 5$

74. If two circles are such that the centre of one lies on the circumference of the other then the ratio of common chord of the two circles to the radius of any one of the circles is:

(1) 2:1 (2) $\sqrt{3}:1$ (3) $\sqrt{5}:1$ (4) 4:1

Ans. *(2)*

Sol.

OAO'B is rhombus. $\therefore$ $\angle O = \angle O' = y$

$\angle A = \angle B = x$

$\therefore$ $O'A = O'O$

$2y = R$

$y = R/2$

$x^2 = R^2 - \dfrac{R^2}{4} = \dfrac{3R^2}{4}$

$x = \dfrac{R\sqrt{3}}{2}$ $AB = R\sqrt{3}$

Radius $= R$

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

75. Which of the follownig is most malleable metal?

(1) Na   (2) Si   (3) Au   (4) Pb

Ans. *(3)*

Sol. Gold (Au) is most malleable

76. When carbon dioxide is passed through lime water then:

(1) calcium hydroxide is formed.   (2) Colour of lime water disappears.

(3) White precipitates of calcium carbonate is formed.   (4) White precipitates of calcium oxide

Ans. *(3)*

Sol. Lime water turns milky due to precipitates of calcium carbonate.

77. Arrange the following elements in the order of their decreasing metallic character:

(1) Cl > Si > Al > Mg > Na   (2) Na > Mg > Al > Si > Cl   (3) Na > Al > Mg > Cl > Si   (4) Al > Na > Si > Ca > Mg

Ans. *(2)*

Sol. Metallic character decreases along the period.

78. Meena visited a natural gas compressing unit and found that the gas can be liquefied under specific conditions of temperature and pressure while sharing her experience with friends she got confused. Help her to identify the correct set of conditions.

(1) Low temperature, Low pressure   (2) High temperature, Low pressure

(3) Low temperature, High pressure   (4) High temperature, High pressure

Ans. *(3)*

Sol. Gases can be liquified at low temperature and high pressure.

79. The scattering of beam of light is shown by

(1) Mud water   (2) Milk   (3) Copper sulphate solution   (4) NaCl solution

Ans. *(2)*

Sol. Milk (colloidal solution) shows tyndall effect

80. What is the formula of acetone?

(1) CH_3CH_2COOH (2) CH_3COCH_3 (3) CH_3CH_2CHO (4) $CH_3CH_2COCH_3$

Ans. *(2)*

Sol. Acetone CH_3COCH_3

81. Match' the correct 'atomic radius with the element

Element	Atomic radius (pm)
(a) Be	(i) 75
(b) C	(ii) 88
(c) O	(iii) 111
(d) B	(iv) 77
(e) N	(v) 74

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

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

Ans. *(2)*

Sol. Atomic radius decrease as

Be > B > C > N > O

82. 22 carat gold means

(1) 20 parts of pure gold alloyecl with 2 parts of Cu or Ag

(2) 22 parts of pure gold alloyed with 2 parts of Cu or Zn

(3) 21 parts or pure gold alloyed with 1 parts of Cu or Ag

(4) 22 parts of pure gold alloyed with 2 parts of Cu or Ag

Ans. *(4)*

Sol. Factual

83. Anodising is a process of forming a oxide layer of

(1) Zinc   (2) Aluminum   (3) Copper   (4) Tin

Ans. *(2)*

Sol. Factual

84. Which of the following element does not have allotrope?

(1) P   (2) B   (3) Bi   (4) S

Ans. *(2)*

Sol. Factual

85. Which of following combination about acids is incorrect?

(1) Ethanoic acid   vinegar

(2) Citric acid   orange

(3) Carbonic acid   Soft Drinks

(4) Lactic acid   Tea

Ans. *(4)*

Sol. Factual

86. Which is chemically most active non metal?

(1) Br_2 (2) N_2 (3) O_2 (4) F_2

Ans. *(4)*

Sol. Fluorine is most reactive

87. A ball is released from the top of a tower of height h meter. It takes T seconds to reach the ground. What is the position of the ball at T/3 second?

(1) $\dfrac{8h}{9}$ m from the ground (2) $\dfrac{7h}{9}$ m from the ground (3) $\dfrac{h}{9}$ m from the ground (4) $\dfrac{17h}{18}$ m from the ground

Ans. *(1)*

Sol. u = 0

Time taken to cover h = T

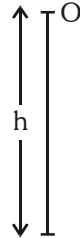$S_0 = ut + \dfrac{1}{2}gt^2$

$S_1 = \dfrac{1}{2}g(T)^2$

$S_2 = \dfrac{1}{2}g\left(\dfrac{T}{3}\right)^2$

$S_2 = \dfrac{1}{2}g\dfrac{T^2}{9}$

$\dfrac{S_1}{S_2} = \dfrac{1}{9}$

Postion of ball at T/3 second

Ball is $\dfrac{8h}{9}$ from ground.

88. Two bodies have masses 2m and m. Their Kinetic energies are in the ratio 8:1. Their linear momentum are in the ratio of

(1) 1:1　　　　(2) 2:1　　　　(3) 4:1　　　　(4) 8:1

Ans. *(3)*

Sol. $m_1 = 2m$　　　　$\dfrac{KE_1}{KE_2} = \dfrac{8}{1}$

$m_2 = m$

$KE = \dfrac{P^2}{2m}$　　　　$\dfrac{P_1}{P_2} = \dfrac{4}{1}$

89. Water is pouring down from a waterfall at the rate of 75 kg/s on the blades of a turbine. If the height of the fall is 100m, then power delivered to the turbine is nearly

(1) 95 kw　　　　(2) 75 kw　　　　(3) 100 kw　　　　(4) 0 kw
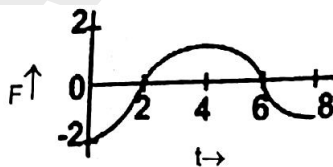
Ans. *(2)*

Sol. Height = 100 m

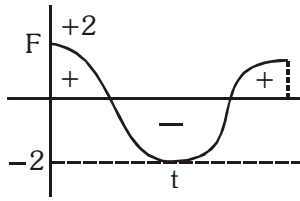Rate of water flow = 75 kg/s

Power delivered = $\dfrac{W}{t}$ = 75KW

90. A force - time graph for a linear motion is shown. The linear momentum changed between 0 and 8 second is

(1) –2π Ns　　　　(2) Zero　　　　(3) 4π Ns　　　　(4) 6π Ns

Ans. *(2)*

Sol. Change in momentum = 0


Net area under curve = 0

91. The length of a given cylindrical wire is increased by 100%. Due to consequent decrease in diameter, the change in the resistance of the wire will be

(1) 200%   (2) 100%   (3) 50%   (4) 300%
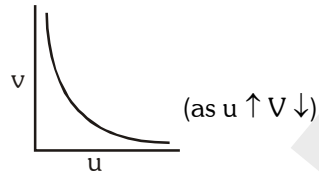
Ans. *(4)*

Sol. $R = \rho \dfrac{l}{A}$

$R' = \rho \dfrac{l'}{A'} = \rho \dfrac{2l \times 2}{A}$

$\dfrac{R' - R}{R} \times 100 = 300\%$

92. In an experiment to find the focal length of a concave mirror, a graph is drawn between magnitude of u and v. The graph looks like

(1)   (2)   (3)   (4)

Ans. *(3)*

Sol. $\dfrac{1}{v} + \dfrac{1}{u} + \dfrac{1}{f}$

(as u ↑ V ↓)
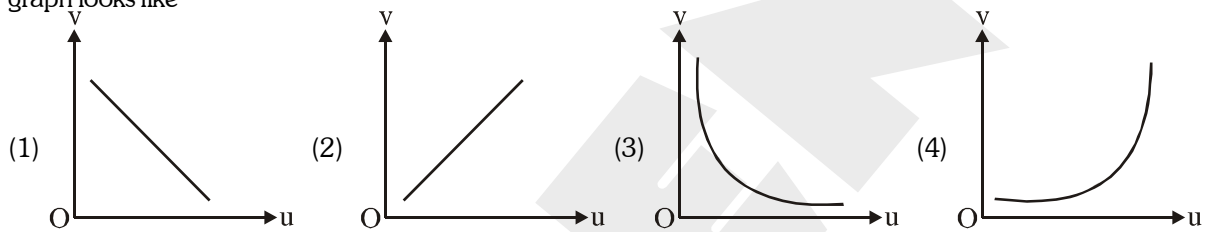
93. Two circular coils of diameter 10 cm and 20 cm have same number of turns. The ratio of magnetic field inductions produced at the centres of coils when connected in series is

(1) 1:2   (2) 3:2   (3) 2:1   (4) 2:3

Ans. *(3)*

Sol. 2 : 1

$B = n \dfrac{\mu_0 I}{2r}$

$\dfrac{B_1}{B_2} = \dfrac{n \dfrac{\mu_0 I}{2[5]}}{n \dfrac{\mu_0 I}{2[10]}}$ = 2 : 1

94. Green light of wavelength 5460 $\overset{\circ}{A}$ is incident on an air-glass interface. If the refractive index of glass is 1.5, the wavelength of light in glass would be (given velocity of light in air $c = 3 \times 10^8 \, m \, s^{-1}$)

(1) 3640 $\overset{\circ}{A}$ (2) 5460 $\overset{\circ}{A}$ (3) 4861 $\overset{\circ}{A}$ (4) None of the above

Ans. *(1)*

Sol. 3640 $\overset{0}{A}$

$$\frac{\mu_g}{\mu_a} = \frac{\lambda_a}{\lambda_g}$$

$$1.5 = \frac{460}{\lambda_g}$$

$$\lambda_g = 3640 \overset{0}{A}$$

95. What is the value of R in the circuit given below if the current passing through the battery is 0.25A.
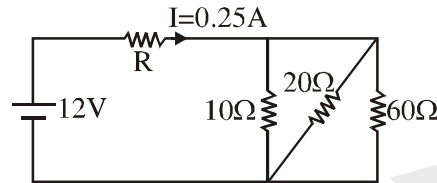
(1) 42Ω (2) 62Ω (3) 84Ω (4) None of these

Ans. *(1)*

Sol. 42Ω

$$\frac{1}{R} = \frac{1}{10} + \frac{1}{20} + \frac{1}{60}$$

R = 6Ω

Total resistance = R + 6

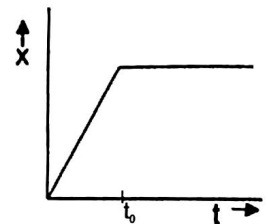V = IR

12 = 0.25 (6 + R)

R = 42Ω

**96.** Figure shows the displacement- time graph of a particle moving along X - axis.

(1) The particle is continuously going in positive x-direction.
(2) The particle is at rest.
(3) The velocity increases upto time 't_0' and then becomes constant.
(4) The particle moves at a constant velocity upto time 't_0' and then stops.

Ans. *(4)*

Sol. Straight line represents constant velocity.

97. A block of mass m is at rest under the action of force F against a wall as shown in figure.
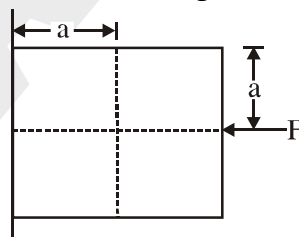
Which of the following statement is incorrect?
(1) f = mg (where f is the frictional force)
(2) F=N (where N is the normal force)
(3) F will not produce torque
(4) N will not produce torque

Ans. *(4)*

Sol. N will not produce torque.

98. A hot and cold body are kept in vacuum separated from each other. Which of the following causes decrease in temperature of the hot body?

(1) Radiation   (2) Convection

(3) Conduction   (4) Temperature remains unchanged

Ans. *(1)*

Sol. No direct contact between the bodies. There is no medium between the two bodies.

99. A man is standing at the middle point between two cliffs. On clapping his hands, a series of echoes are heard at the interval of 1 Sec. If the speed of sound is 350 m/s, the distance between the two cliffs is

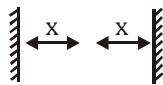(1) 175m   (2) 350m   (3) 525m   (4) 700m

Ans. *(2)*

Sol. $2x = v \times t$

$2x = 350 \times 1$

Two times, $2x = 350$

$x = 175$ m

100. A rubber ball filled with water is having a small hole. This is used as the bob of a simple pendulum. Then, the period of such a pendulum

(1) Decreases   (2) first increases then decreases

(3) First decreases then increases   (4) Increases

Ans. *(2)*

Sol. First increasing then decreases because first lenght increase and then decrease due to change in position of centre of mass.