NSEJS-2017

1. Rajiv, Nikhil, Shubha and Nilima wanted to establish a relationship between loss in weight of a solid with weight of water displaced by immersing it in tap water and sea water. After performing their experiment, they noted their observations for the same solid as follows:

    Rajiv: Loss of weight of solid is more in tap water.

    Nikhil: Loss of weight of solid is more in sea water.

    Shubha: Loss of weight of solid is equal in the tap water and the sea water.

    Nilima: Loss of weight of solid may be more in tap water or sea water, depending upon how deeply it is immersed,

    Identify the correct observation

    (a) Nikhil   (b) Nilima   (c) Shubha   (d) Rajiv

2. The ratio of atoms present in 4g of magnesium of 4g of sulphur is (Mg = 24; S= 32)

    (a) 1:1   (b) 2:1   (c) 3:2   (d) 3 :4

3. If Z = 10 the valence of the element is ....

    (a) Zero   (b) One   (C) Two   (d) Three

4. The average atomic mass of an element X is 80u. The percent of isotopes $^{79}X_{35}$ and $^{82}X_{35}$ in the sample is:

    (a) 90.99 and 9.01   (b) 80.8 and 19.2   (c) 66.67 and 33.34   (d) 50 and 50

5. An aqueous solution used to preserve biological specimen is

    (a) Methane   (b) Methanol   (c) Methanal   (d) Methanoic acid

6. The molecular formulae of some organic compounds are given below, which of these compounds contains a Ketone group?

    (a) $C_3H_6O_2$ (b) C_3H_6O (c) C_3H_4O (d) C_3H_8O

7. 'Duralumin' is an alloy of aluminum with

    (a) iron, manganese and magnesium   (b) copper, manganese and magnesium

    (C) Copper, chromium and magnesium   (d) iron, nickel and magnesium

8. Tooth decay starts when the pH around tooth is around:

    (a) 7.5   (b) 7   (c) 6.5   (d) 5.5

9. What will happen if a copper piece is dipped in aqueous solution of silver nitrate for quite some time?

    (i) Solution will remain colourless (ii) Solution will turn blue(iii) Silver will deposit on the copper piece(iv) Bubbles of brown gas will be formed around copper piece

    (a) I and iv   (b) ii and iv   (c) ii and iii   (d) iii and iv

10. Neeta mixed 10 ml of 0.1 M HCl solution with 15mL of 0.067 M NaOH solution. She checked the pH of the resulting solution using pH paper. The colour obtained was

Red			Orange	Yellow	Green	Pale blue	Dark blue	Violet
Strong acid ⟵ Weak acid					Neutral	Weak alkali ⟶ Strong alkali		

    (a) Green   (B) Yellow   (c) Pale blue   (d) Violet

11. (I) $Zn + CuSO_4$ (aq) → Reaction occurs

    (II) $Zn + Al_2(SO_4)_3$(aq) → Reaction doses not occur

    (III) $Zn + AgNO_3$(aq) → Reaction does not occur

    (IV) $Zn + PbNO_3$ (aq) → Reaction occur

    Which of the above statement is not correct?

    (a) I   (b) II   (c) III   (d) IV

12. An open vessel contains air at $27^{o}C$. The vessel is heated till two-fifth of the air in it has been expelled. Assuming the volume of the vessel remains constant, find the temperature to which the vessel has to be heated?

   (a) 750 K   (b)700 K   (c) 550 K   (d) 500 K

13. A teacher wanted to give acid base titration to her students. For that she prepared (i) HCl solution by dissolving 73g of hydrochloric acid in one litre of water and (ii) sodium hydroxide solution by dissolving 0.46g of sodium metal in one litre of water. Find the volume of the hydrochloric acid solution required for complete neutralization of sodium hydroxide solution.

    (Cl = 35.5; Na = 23.0; O = 16.0)

    (a) 20mL   (b) 10mL   (c) 46mL   (d) 5 Ml

14. What would be the atomic number of the next halogen element, if discovered in future?

(Periodic table provided –page2)

(a) 103   (b) 115   (c) 117   (d) 121

15. A white solid known to be a compound of sodium, gives rise to water vapour and a colouress gas on heating. The residual white powder is dissolved in water and when the solution is added to alum solution, a white gelatinous precipitate is obtained. The original solid was:

(a) Sodium carbonate   (b) Sodium bicarbonate (c) Sodium hydroxide   (d) Sodium nitrate

16. Harsha was trying to neutralize phosphoric acid using various bases. Those available were caustic soda, lime water and hydrated alumina. If Harsha took 1 equivalent of phosphoric acid each time, what will be the ratio for moles of each of the above bases required for complete neutralization?

(a) 1:1:1   (b) 1:05:0.33   (c) 1:2:3   (d) 1:0.33:0.5

17. A flask containing SO_2 gas was weighed at a particular temperature and pressure. The flask was then flushed and filled with oxygen gas at the same temperature and pressure. The weight of SO_2 in the flask will be about:

(a) Same as that of oxygen,   (b) One-fourth that of oxygen

(c) Four times that of oxygen,   (d) Twice that of oxygen

18. Arun needs 1.71 g of cane sugar ($C_{12}H_{22}O_{11}$) to sweeten his tea. What would be the number of carbon atoms consumed through sugar in the tea?

(a) 3.66×10^{22} (b) 7.2×10^{21} (c) 5×10^{21} (d) 6.6×10^{22}

19. Choose the correct sets which represent the oxides as → Acidic : basic : neutral : Amphoteric respectively (i) CO_2 : MgO : N_2O : H_2O (ii)SO_2:NO:CO:Al_2O_3(III) P_2O_5:ZnO:NO:Al_2O_3

(iv) SO_3 : CaO : N_2O : PbO

(a) I & ii   (b) ii & iii   (c) iii & iv   (d) I & iv

20. During a meteorite shower a few meteorites fell into a water body having pH around 7. The pH of the water body was measured after meteorite shower and found to be

(a) > 7   (b) < 7

(c) =7   (d) no change in pH of water due to the meteorite shower

21. The positions of two blocks at successive 0.20-secnd time intervals are represented by the numbered squares in the figure below. The blocks are moving towards right.
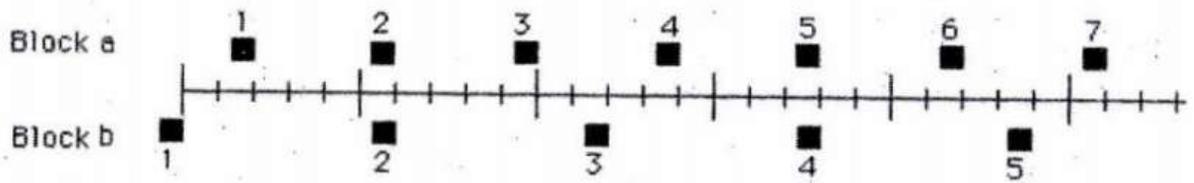

The accelerations of the blocks are related as follows:

(a) Acceleration of 'a' is greater than acceleration of 'b'

(b) Acceleration of 'a' equals acceleration of 'b'. Both accelerations are greater than zero.

(c) Acceleration of 'b' is greater than acceleration of 'a'

(d) Acceleration of 'a' equals acceleration of 'b'. Both accelerations are zero.

22. In rural areas, an indigenous way of keeping kitchen materials cool is to put them in a box and wrap the box with wet blanket; the blanket is kept wet as tap is allowed to drip in to its corner.

Choose the correct statement:

(a) This method works because the water from the tap is cold. If one uses room temperature water, it will not work.

(b) Method will work only if the box is a bad conductor of heat. If one uses tin box, it will not work.

(c) Method doesn't work.

(d) This method works because the latent heat necessary for evaporation of water in the blanket is taken from the box so the box and its content remain cool.

23. In the adjacent circuit what is the current flowing from N to K?
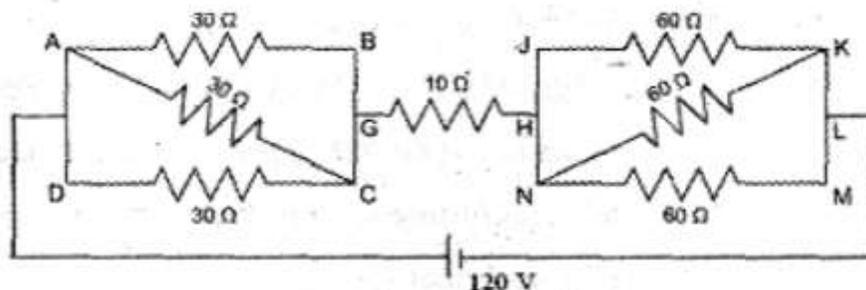
(a) 3A   (b) 2A   (c) 1A   (d) 0.5A

24. If x, v and t represent displacement (m), velocity (m/s) and time (s) respectively for a certain particle then which pair of the following figures can be best correlated to each other:

Fig. I   Fig. II   Fig .III   Fig. IV
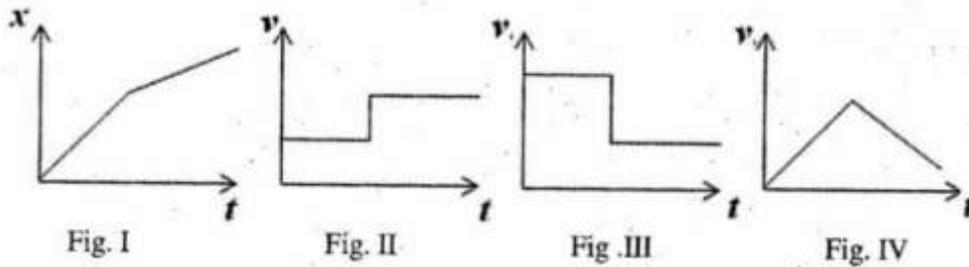
(a) I&II   (b) I & II   (c) I &IV   (d) none

25. The take-off speed of Airbus A340 is 288 km/hr. From the taxi it comes to the main runway and waits for a while for the final clearance from Air Traffic Control. The aircraft then achieves this speed within 50 seconds. Neglecting the effect of the wind direction and friction, what should be the minimum length of main runway decided by civil engineers for this aircraft for a take-off?

(a) 1800m   (b) 2000m   (c) 2200m   (d) 2400m

26. An empty office chair is at rest on a floor. Consider the following forces:

I- A downward force of gravity,

II – An upward force exerted by the floor,

III – A net downward force exerted by the air.

The, which of the force(s) is (are) acting on the office chair?

(a) I only   (b) I and II   (c) I, II and III

(d) None of the forces. (Since the chair is at rest there are no forces acting upon it)

27. The ability of eye to focus both near and distant objects, by adjusting its focal length, is called

(a) Myopia   (b) Presbyopia   (c) Accommodation of eye   (d) Tyndall effect

28. In bringing a α-particle towards another α-particle, the electrostatic potential energy of the system_____.

(a) Increases   (b) Decreases   (c) remains unchanged   (d) Become zero

29. A magnet is placed between two coils AB and CD as shown. It is being moved in the direction as shown by the arrow, and then which of the following statement is correct:
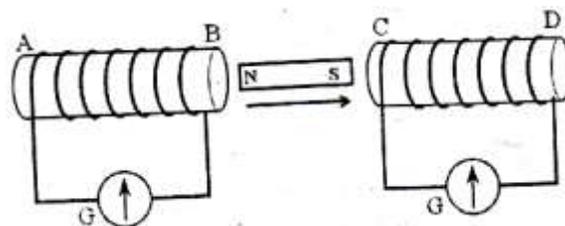

(a) Looking from end A, current in coil AB will be anticlockwise and looking from end D, the direction of current in coil CD will be anticlockwise

(b) Looking from end A, current in coil AB will be clockwise and looking from end D, the direction of current in coil CD will be clockwise

(c) Looking from end A, current in coil AB will be clockwise and looking from end D, the direction of current in coil CD will be anticlockwise

(d) Looking from end A, current in coil AB will be anticlockwise and looking from end D, the direction of current in coil CD will be clockwise

30. A boy throws a steel ball straight up. Consider the motion of the ball only after it has left the boy's hand but before it touches the ground and assume that forces exerted by the air are negligible. For these conditions, the force(s) acting on the ball is (are):

(a) a downward force of gravity along with a steadily decreasing upward force.

(b) A steadily decreasing upward force from the moment it leaves the boy's hand until it reaches it highest point; on the way down there is a steadily increasing downward force of gravity as the object gets closer to the earth.

(c) Constant downward force of gravity along with an upward force that steadily decreases until the ball reaches its highest point; on the way down there is only a constant downward force of gravity.

(d) Constant downward force of gravity only.

31. A large truck collides head-on with a small compact car. During the collision:

(a) The truck exerts a greater force on the car than the car exerts on the truck.

(b) The car exerts a greater force on the truck than the truck exerts on the car.

(c) The truck exerts a force on the car but the car does not exert a force on the truck.

32. A common hydrometer has a uniform scale and its stem is graduated downwards from 0 to 20. While floating in water, it read 0 and while floating in a liquid of density 1.40 g/cm^3, it reads 20. Then the density of the liquid in which it will read 10 is_____.

(a) 0.7 g/cm^3 (b) 0.85 g/cm^3 (c) 1.17g/cm^3 (d) 2.8 g/cm^3

33. For the same angle of incidence, the angle of refraction in three different media A, B, C are $15^0, 25^0$ and 35^0 respectively. Then which statement is correct: _____. (μ_A is refractive index of A)

(a) μ_A is maximum and velocity of light is maximum in medium A.

(b) μ_A is minimum and velocity of light is maximum in medium A.

(c) μ_A is maximum and velocity of light is minimum in medium A

(d) μ_A is minimum and velocity of light is minimum in medium A.

34. A liquid, whose density doesn't change during the motion, is flowing steadily through a pipe of varying cross sectional area as shown in the adjacent figure. If a_1, a_2 are the cross sectional area v_1, v_2 are the value of velocities (or speed) at L and H respectively, then the correct relation between a_1, a_2 and v_1, v_2


(a) $a_1 v_2 = a_2 v_1$ (b) $a_1 v_1 = a_2 v_2$ (C) $a_1^2 v_2 = a_2^2 v_1$ (d) $a_1 v_1^2 = a_2 v_2^2$

35. As shown in adjacent figure, two plane mirrors M1 and M2 are inclined to each other at an angle 70^0 (angle M1OM2). Incident ray AB makes an angle of incidence θ on M1. This ray after reflection at B on M1 and further at C on M2 travels along the direction CD, such that path CD is parallel to M1. Then angle θ is_____
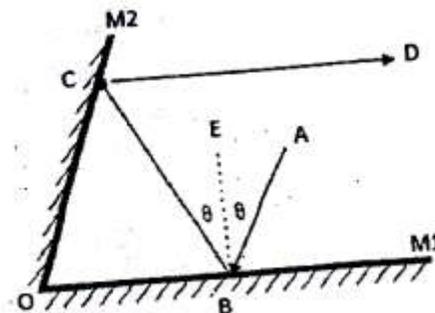
(a) 45^0 (b)50^0 (c)55^0 (d)60^0

36. A copper disc of radius a_0 has a hole of radius b_0 at the centre, at 00C. The disc is now heated and maintained at 200^0C. The new radii of disc and hole are a_t and b_t respectively: For the heated disc it can be concluded that:
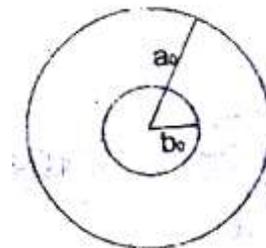
(a) $a_0 < a_t$, $b_0 < b_t$ and density of disc decreases

(b) $a_0 < a_t$, $b_0 > b_t$ and density of disc decreases

(c) $a_0 < a_t$, $b_0 < b_t$ and density of disc increases

(d) $a_0 < a_t$, $b_0 > b_t$ and density of disc increases

37. A concave mirror of radius of curvature 1m is placed at the bottom of a water tank. The mirror forms an image of the sun when it is directly overhead. If the depth of water in the tank is 80 cm, then the distance of the image formed is _____. (Refractive index of water is 1.33)

(a) On surface of water

(b) 100cm above mirror

(c) 50cm above mirror

(d) image cannot be formed

38. The equivalent resistance of two resistance in series is 'S'. These resistances are now joined in parallel. The parallel equivalent resistance is 'P'. If S = n P. Then the minimum possible value of n is

(a) 2
(b) 3
(c) 4
(d) 5

39. An electron and α-particle enter a region of uniform magnetic field (of induction B) with equal velocities. The direction of B is perpendicular and into the plane of the paper. Then qualitatively identify the direction of paths of electron and the α-particle.
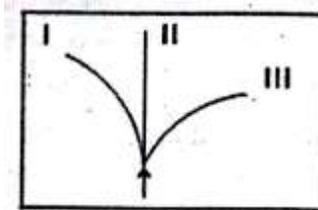
(a) I for α-particle, II for electron

(b) I for electron, II for α-particle

(c) I for α-particle, III for electron

(d) I for electron, III for α-particle

40. Two wave pulses I and II have the same wavelength. They are travelling in the directions as shown by the single headed arrows. The resultant sketch of the two wave pulses at some instant of time when P coincides with R is__
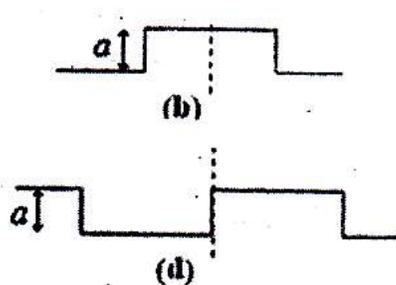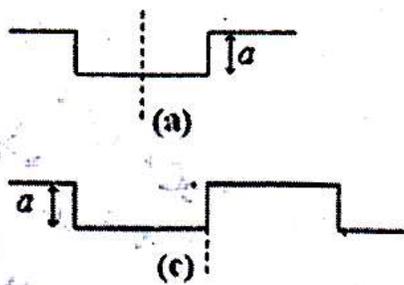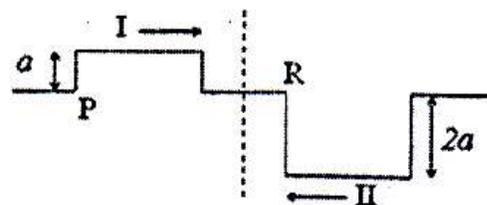
41. Ravi mixed two substances A and B in a vessel and left it as it is. After few hours he detected an alcoholic smell emanating from the vessel. Identify What A and B are:

(a) Salt solution and Lactobacillus

(b) Fruit juice and Saccharomyces

(c) Fruit juice and Lactobacillus

(d) Salt and solution and Saccharomyces

42. Which among the following shows the characters of both plants and animals:

i. Anabaena
ii. Paramecium
iii. Euglena
iv. Amoeba

(a) i and iv
(b) iii
(c) ii
(d) i and ii

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43.	Which amongst the following are not plastids?

(a) Leucoplasts	(b) Chromoplasts	(c) Amyloplasts	(d) Tonoplasts

44.	During a study the number of cells was recorded to increase as follows:

64 → 128 → 256 → 512 → 1024. This represents:

(a) Budding	(b) Meiosis	(c) Binary fission	(d) Fragmentation

45.	A plant kept in a box with only a hole for entry of light shows bending, the process called phototropism. It occurs due to:

(a) Synthesis and diffusion of cytokinin in the leaves

(b) Breakdown of auxin in the shoot

(c) Synthesis and diffusion of abscisic acid

(d) Synthesis and diffusion of auxin in the shoot.

46.	What would be the minimum required length of codon to encode 400 amino acids, if there existed three purines and pyrimidines each?

(a) 3	(b) 4	(c) 5	(d)6

47.	A 'life-style' disorder among these is

(a) Hypertension	(b) Presbyopia	(c) Herpes	(d) Scurvy

48.	Metamerism is a characteristic of

(a) Hirudinaria	(b) Taenia	(c) Asterias	(d) Pila

49.	Health is all about 'eating-fasting' balance. When you fast for extended periods, your cells clean out and recycle the intracellular garbage. The organelles responsible for this are:

(a) Microtubules	(b) Microfilaments	(c) Golgi Apparatus	(d) Lysosomes

50.	A plant may not exchange CO_2 or O_2 with air at:

(a) Twilight	(b) Mid-night	(c) late hours in the morning	(d) noon

51.	If small part of the esophagus of a person is excised, the consequence would be the person will have to eat__

(a) Larger portion of food with large time interval

(b) Small portion of food at small time interval

(c) small portions of food at large time interval

(d) Majorly subsist on liquid diet

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52. When heated, the hydrogen bonds between the complementary strands of DNA break and the 2 strands separate in a process called melting. Which of the following pieces of DNA require maximum temperature for melting?

(a) 3' AAGGTATACAAT 5'   (B) 3' GAGCUAUCCGAG 5'

      5' TTCCATATGTTA 3'   5'CUCGAUAGGCUC 3'

(c) 3' ACGTCCGCTGCG 5'   (d) 3; ATTAGCTAGCAA 5'

      5' TGCAGGCGACGC 3'   5'TAATCGATCGTT 3'

53. In a self-pollinated plant, what would be minimum number of meiotic divisions a required for setting 400 seeds?

(a) 100   (b) 200   (c)400   (d)500

54. If a flower is producing a large number of minute and smooth pollen, the agency for cross pollination is most likely to be:

(a) Air   (b) Water   (c) Insects   (d) Bats

55 To meet the increasing demand of food, there have been several 'revolutions' which of the following revolutions is likely to have contributed most to global warming?

(a) Green   (b) White   (c) blue   (d) Silver

56. A mammal adapted to desert conditions is likely to have large:

(a) Nostrils   (b) Pinnae   (c) Muzzle   (d) Nails

57. Which of the following feature indicates omnivorous feeding of human species?

(a) Presence of canines as well as premolars and molars

(b) Presence of appendix

(c) Presence of 11th and 12th pair of ribs

(d) Presence of opposable thumb

58. In a dihybrid cross, what is the proportion of organisms with dihybrid genotype?

(a) 2/16   (b) 6/16   (c) 4/16   (d) 9/16

59. If the cell is using less oxygen molecules than the molecules of carbon dioxide evolved in respiration, the substrate for respiration has to be

(a) Simple sugars   (b) Organic acids   (c) Fatty acids   (d) Cholesterol

60. Panting is a means of thermoregulation in dogs. This is due to

(a) High specific heat of water   (b) high vapour pressure of water

(c) High latent of vapourization   (d) high specific gravity of water

61. How many four digit numbers are there such when they are divided by 101, they have 99 as remainder?

(a) 90   (b) 98   (c) 100   (d) 101

62. if $x = (\sqrt{21} - \sqrt{20})$ and $y = (\sqrt{18} - \sqrt{17})$, then

(a) x = y   (b) x < y   (c) x > y   (d) x + y = 0

63. What is the sum of all odd number between 500 and 600?

(a) 26000   (b) 27000   (c) 27500   (d) 29500

64. $1\dfrac{1}{2} + 1\dfrac{1}{6} + 1\dfrac{1}{12} + 1\dfrac{1}{20} + 1\dfrac{1}{30} \ldots\ldots + 1\dfrac{1}{380} = $ _____

(a) 20.25   (b) 20.05   (c) 19.95   (d) 19.85

65. A train is running at speed of 54 km/hr. It is not stopping at a certain station. It crosses the person showing green flag in 20 seconds and crosses the platform in 36 seconds. What is the length of the train?

(A) 240m   (b) 300m   (c) 320m   (d) 360m

66. If triangle ABC, segment AD, segment BE and segment CF are altitudes. If AB x AC = 172.8 cm^2 and BE x CF = 108.3 cm^2 then AD x BC = _____

(a) 136.8cm^2 (b) 132.4 cm^2 (c) 129.2cm^2 (d) 128.56cm^2

67. Diagonals of a quadrilateral bisect each other. Therefore the quadrilateral must be a_____

(a) Parallelogram   (b) rhombus   (c) rectangle   (d) square

68. If (a + b + c +d) =4, then

$$\frac{1}{(1-a)(1-b)(1-c)} + \frac{1}{(1-b)(1-c)(1-d)} + \frac{1}{(1-c)(1-d)(1-a)} + \frac{1}{(1-d)(1-a)(1-b)} = $$ ____

(a) 0   (b) 0.25   (c) 1   (d) 4

69. The sum of two numbers is 13 and the sum of their cubes is 1066. Find the product of those two numbers.

(a) 26   (b) 27   (c) 28   (d) 29

70. By which smallest number we should divided 198386198 to get a perfect square?

   (a) 14   (b) 18   (c) 22   (d) 28

71. What will be the remainder if the number $(7)^{2017}$ is divided by 25?

   (a) 1   (b) 7   (c) 18   (d) 24

72. If □ ABCD is a cyclic quadrilateral, AB = 204, BC = 104, CD = 195, DA = 85 and BD = 221. Then AC
   =____

   (a) 210   (b) 220   (c) 225   (d) 240

73. If $x^2 + xy + xz = 135$, $y^2 + yz + xy = 351$ and $z^2 + xz + yz = 243$, then $x^2 + y^2 + z^2 =$_____

   (a) 225   (b) 250   (c) 275   (d) 300

74. What is the radius of the circum circle of triangle whose sides are 30cm, 36cm and 30cm?

   (a) 15cm   (b) 16cm   (c) 17cm   (d) 18cm

75. On seventy first 'Independence day' there was Tuesday. After how many years there will be
   Tuesday on 'Independence day'?

   (a) 4 yrs   (b)5 yrs   (c) 6yrs   (d) 7 yrs

76. If $p + q + r = 2, p^2 + q^2 + r^2 = 30$ and pqr=10, the value of *(1-p) (1-q)(1-r)* will be

   (a)-18   (b) -24   (C) -27   (d)-35

77. The mean o the following frequency distribution is _____

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	6	8	10	12

   (a) 25   (b) 28   (c) 30   (d) 32

78. If the roots of the equation $\dfrac{x^2 - bx}{ax - c} = \dfrac{m-1}{m+1}$ are equal and of opposite signs, then the value of 'm'
   is_____

   (a) $\dfrac{a-b}{a+b}$ (b) $\dfrac{a+b}{a-b}$ (c) $\dfrac{ab}{a+b}$ (d) $\dfrac{a+b}{ab}$

79. If $(x + \dfrac{1}{x}) = 5$ then $\left(x^3 + \dfrac{1}{x^3} \right) - 5 \left(x^2 + \dfrac{1}{x^2} \right) + \left(x + \dfrac{1}{x} \right) = $ _____

   (a) 0   (b) 5   (c) -5   (d) 10

80. if $x^2 - 3x + 2$ is a factor of $x^4 - px^2 + q$, then p, q are:

   (a) 2,3   (b) 4,5   (c) 5,4   (d) 0,0

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