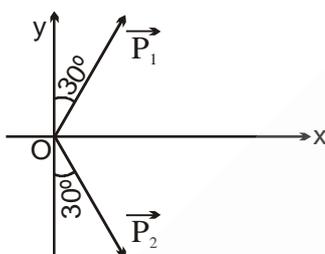


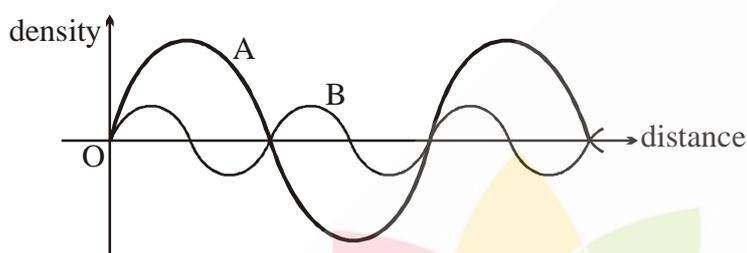
## YEAR-2010-11\_NSEJS(STAGE-I)

- Which one of the following statements is INCORRECT ?  
 (A) If the net force on a body is zero, its velocity is constant or zero  
 (B) If the net force on a body is zero, its acceleration is constant and non-zero  
 (C) If the velocity of a body is constant, its acceleration is zero  
 (D) A body may have a varying velocity yet a constant speed
- Two forces each of magnitude  $P$  act on a body placed at a point O as shown. The force necessary to keep the body at rest is of magnitude.



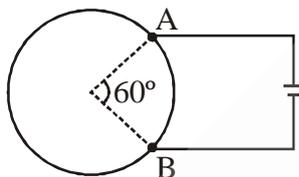
- (A)  $P$  along + X axis      (B)  $P$  along – X axis      (C)  $2P$  along + X axis      (D)  $P/2$  along – X axis
- Two spheres having masses 10 g and 25 g are projected horizontally from the same height with velocities  $v_1$  and  $v_2$  and they fall to the ground in time intervals  $t_1$  and  $t_2$  respectively. If the ratio  $v_1 : v_2$  is 1 : 3, the ratio  $t_1 : t_2$  will be  
 (A) 10 : 25      (B) 25 : 10      (C) 1 : 1      (D) 1 : 3
  - The SI unit of temperature is  
 (A) degree fahrenheit ( $^{\circ}$  F)      (B) degree celsius ( $^{\circ}$  C)  
 (C) degree kelvin ( $^{\circ}$  K)      (D) None of the above
  - A convex lens  $L_1$  forms an image of the same size as that of the object at a distance of 24 cm. If the lens  $L_1$  is replaced by another convex lens  $L_2$ , the image formed is magnified and erect. Therefore, the focal length of  $L_2$  is  
 (A) less than 12 cm      (B) 12 cm  
 (C) between 12 cm and 24 cm      (D) more than 24 cm
  - A wooden ball of density  $0.8 \text{ g/cm}^3$  is placed in water. The ratio of the volume above the water surface to that below the water surface is  
 (A) 0.25      (B) 0.20      (C) 2.0      (D) 4.0
  - The order of corrosion of metals, namely aluminum, iron, tin and zinc is  
 (A) Fe > Sn > Al > Zn      (B) Sn > Fe > Al > Zn  
 (C) Al > Zn > Fe > Sn      (D) Fe > Zn > Sn > Al
  - A stone is released from an elevator moving upwards with an acceleration  $a$ . The acceleration of the stone after the release is  
 (A)  $a$  upwards      (B)  $(g - a)$  upwards      (C)  $(g - a)$  downwards      (D)  $g$  downwards
  - a converging beam of light falls on a convex mirror of radius of curvature 20 cm, the point of convergence being 10 cm behind the mirror. The image is  
 (A) virtual and formed 10 cm in front of the mirror      (B) real and formed in front of the mirror  
 (C) formed at infinity      (D) virtual and formed 10 cm behind the mirror
  - $[\text{O}^{2-}]$  ion is represented as  
 (A)  $[\text{O}]^{2-}$       (B)  $[\text{O}]^{2-}$       (C)  $[\text{O}]^{2-}$       (D)  $[\text{O}]^{2-}$

11. The different coloured dyes present in black ink can be separated by  
 (A) evaporation (B) distillation (C) centrifugation (D) chromatography
12. Bacteria cannot survive in a highly salted pickle because  
 (A) they become plasmolysed and consequently die.  
 (B) they do anaerobic respiration.  
 (C) water is not available to them.  
 (D) of all the reasons mentioned above.
13. In the absence of atmospheric refraction  
 (A) both the sunrise and the sunset would be delayed  
 (B) both the sunrise and the sunset would occur earlier  
 (C) the sunrise would be delayed and the sunset would occur earlier  
 (D) the sunrise would occur earlier the sunset would be delayed
14. When a sound wave moves through air along X axis, there is a variation in density of air in this direction. The graphical representation of this variation for two sound waves A and B is as shown. Which of the following statements is correct ?

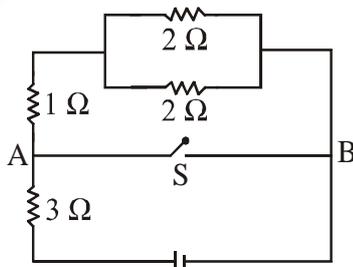


- (A) Frequency of A is greater than that of B (B) Velocity of B is greater than that of A  
 (C) Wavelength of B is greater than that of A (D) Loudness of A is greater than that of B
15. Cycas is classified as gymnosperm because of  
 (i) presence of naked seeds.  
 (ii) lack of vessels in the xylem.  
 (iii) presence of sieve tubes.  
 (iv) fruit formation.  
 The correct reason is  
 (A) (i) and (iv) (B) (i) and (iii) (C) (i) and (ii) (D) (ii) and (iii)
16. In the figure shown below, each of the lenses has a focal length of 10 cm. Therefore, the image formed by the combination of lenses is
- 
- (A) virtual, erect and magnified (B) virtual, inverted and diminished  
 (C) virtual, erect and diminished (D) real, erect and diminished
17. A convex mirror used as the rear view mirror of a motor vehicle has a warning written on it - 'Objective in this mirror are nearer than they appear'. The reason for this warning is that  
 (A) the image is diminished  
 (B) the image distance is less than the focal length of the mirror  
 (C) the image distance is less than the object distance  
 (D) the image distance is more than the object distance

18. While picking up a pair of eye glasses dropped by a friend, you notice that they form an inverted image of the background and that the image is stretched horizontally as well. Your friend suffers from  
 (A) only myopia (B) only hypermetropia  
 (C) only astigmatism (D) hypermetropia as well as astigmatism
19. In additive primary colour processes, which of the following is NOT possible ?  
 (A) (red + green + blue) gives white (B) (blue + green) gives cyan  
 (C) (red + cyan) gives white (D) (green + cyan) gives white
20. A uniform wire of resistance 36 ohm is bent into a circle. A battery is connected between points A and B as shown. The effective resistance between A and B is

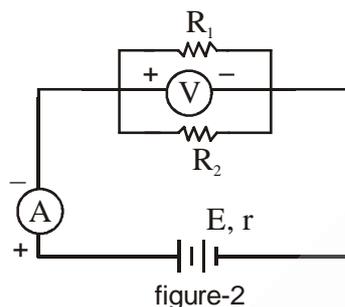
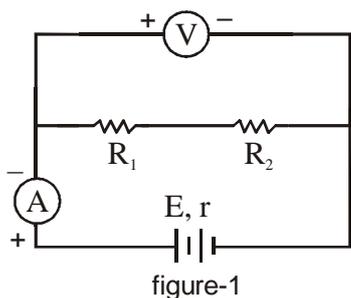


- (A) 36 ohm (B) 30 ohm (C) 6 ohm (D) 5 ohm
21. When 2.8 g of nitrogen reacts with 0.6 g of hydrogen, 3.4 g of ammonia gas is produced. If 5.8 g of nitrogen is allowed to react with 0.6 g of hydrogen, then the amount of ammonia produced is  
 (A) 1.7 g (B) 3.4 g (C) 4.7 g (D) 7.4 g
22. Which one of the following is NOT poisonous ?  
 (A) spider (B) platypus (C) millipede (D) centipede
23. On north pole, when the surface of sea gets frozen due to cold weather, eskimos can still fish by cutting a portion of ice at the surface to find water underneath. This is possible because water  
 (A) has low thermal conductivity (B) has high specific heat  
 (C) has high surface tension (D) shows anomalous behaviour
24. A, DC current flows through a vertical wire in the downward direction. For an observer looking at the wire, the direction of magnetic field at a point between him and the wire is  
 (A) upward (B) to the right (C) to the left (D) downward
25. The valencies of two elements A and B are +2 and +3 respectively. Then, the formulae of sulphate of B and chloride of A respectively are  
 (A)  $B_3(SO_4)_2$  and  $ACl_2$  (B)  $B_2(SO_4)_3$  and  $ACl_2$  (C)  $BSO_4$  and  $A_2Cl$  (D)  $B_2SO_4$  and  $ACl$
26. A number of electric bulbs of rating 220 volt, 100 watt are to be connected in parallel to a 220 volt supply. If a 5 A fuse wire is used for this arrangement to bulbs, the maximum number of bulbs that can be included in the arrangement will be  
 (A) 10 (B) 11 (C) 22 (D) 44
27. In the circuit given below, AB is a thick copper wire and S is a switch. When the switch is closed, the effective resistance of the circuit will be



- (A) 5 ohm (B) 6/5 ohm (C) 3 ohm (D) zero

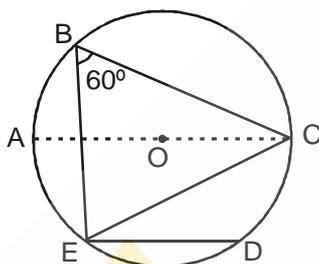
28. In figure (1) ammeter reads  $I_1$  and voltmeter reads  $V_1$ . Similarly, in figure (2) ammeter reads  $I_2$  while voltmeter reads  $V_2$ . Then which of the following statements is correct ?



- (A)  $V_1 > V_2$  and  $I_1 > I_2$   
 (B)  $V_1 > V_2$  and  $I_1 < I_2$   
 (C)  $V_1 < V_2$  and  $I_1 > I_2$   
 (D)  $V_1 < V_2$  and  $I_1 < I_2$
29. Copper sulphate is the salt of  
 (A) a weak acid and a strong base  
 (B) a weak acid and a weak base  
 (C) a strong acid and a weak base  
 (D) a strong acid and a strong base
30. The correct order of evolutionary advancement among the plants is  
 (A) spirogyra → diatom hornwort → fern  
 (B) blue green alga → liverwort → fern → seed bearing plant  
 (C) liverwort → cyanobacterium → moss → gymnosperm  
 (D) red alga → fern → moss → liverwort
31. A solution having pH 2 is mixed with excess of solution of washing soda, the pH of mixture is  
 (A) 4 (B) 5 (C) 6 (D) 8
32. If the altitudes of a triangle are in the ratio 2 : 3 : 4, then the lengths of the corresponding sides are in the ratio :  
 (A) 2 : 3 : 4 (B) 6 : 4 : 3 (C) 3 : 2 : 4 (D) 3 : 2 : 1
33. In case of a right circular cylinder the radius of base and height are in the ratio 2 : 3. Therefore, the ratio of lateral surface area to the total surface area is :  
 (A) 5 : 3 (B) 3 : 5 (C) 2 : 5 (D) 2 : 3
34. Number of molecules present in a given amount of  $\text{CO}_2$  and  $\text{O}_2$  is the same at STP. If the weight of  $\text{CO}_2$  is 5.5 g, then the weight of  $\text{O}_2$  is  
 (A) 5.5 g (B) 4.4 g (C) 4.0 g (D) 2.0 g
35. Lamina of a palm tree is dissected so as to adapt to  
 (A) intense light (B) high wind velocity  
 (C) scarcity of moisture (D) high temperature
36. Isotope used as a fuel in the reactors of nuclear power plants for generating electricity is  
 (A) As-74 (B) U-235 (C) Co-60 (D) I-131
37. If  $\sin \theta + \operatorname{cosec} \theta = 2$ , then  $[\sin^8 \theta + \operatorname{cosec}^8 \theta]$  will have the value  
 (A) 2 (B)  $2^4$  (C)  $2^6$  (D)  $2^8$
38. Which of the following pigments is different from others ?  
 (A) cyanoglobin (B) myoglobin (C) haemoglobin (D) cytochrome
39. The mass of one molecule of phosphorus ( $^{31}\text{P}$ ) is  
 (A) 31 g (B)  $2.059 \times 10^{-22}$  g (C)  $5.147 \times 10^{-23}$  g (D) 124 g
40. All the three sides of a  $\Delta ABC$  have lengths in integral units, with  $AB = 2001$  units and  $BC = 1002$  units. The possible number of triangles with this condition is :  
 (A) 2001 (B) 2002 (C) 2003 (D) 2004

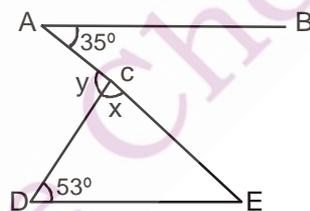
41. The fragrance of burning incense stick spreads all around due to  
(A) the sublimation of incense stick  
(B) the vapourization of incense stick  
(C) the sublimation of fragrance matter into the air  
(D) the diffusion of its smoke into the air
42. In the familiar decimal number system the base is 10. In another number system using base 4, the counting proceeds as 1, 2, 3, 10, 11, 12, 13, 20, 21 .... The twentieth number in this system will be  
(A) 40 (B) 320 (C) 210 (D) 110
43. The boiling point of water at STP is  
(A) 100 K (B) 373 K (C) 273 K (D) 373° C
44. If  $4a - 18b + 13c = 0$  and  $3a + 3b - 4c = 0$ , then the ratio  $a : b : c$  will be :  
(A) 3 : 6 : 5 (B) 5 : 3 : 6 (C) 3 : 5 : 6 (D) 5 : 6 : 3
45. The feature indicating omnivorous nature of man is  
(A) presence of canines and molars (B) long intestine and vestigial appendix  
(C) ability to taste salty and sweet material (D) spacious stomach and caecum
46. Considering the root system, the plant that has adapted to the arid conditions is  
(A) hydrilla (B) sunflower (C) hibiscus (D) khus
47. The random motion of visible particles caused by the much smaller invisible particles of water is an example of  
(A) Brown motion (B) Brownian motion (C) Brownmat motion (D) Browniz's motion
48. The graph of the equation  $y = 2x^2 + 4x + 3$  has its lowest point at :  
(A) (-1, 9) (B) (1, 9) (C) (-1, 1) (D) (0, 3)
49. When a cell fails to communicate with other cells in multicellular organism, it  
(A) becomes cancerous (B) enters mitotic phase  
(C) chooses to die (D) is eaten up by other cells
50. A desert room cooler cools better on hot and dry day due to  
(A) increase in the rate of evapouration (B) decrease in the rate of evapouration  
(C) decrease in the rate of vapourization (D) increase in the rate of diffusion
51. If a, b, c are in continued proportion, the expression  $\frac{a^2 + ab + b^2}{b^2 + bc + c^2}$  can be simplified to :  
(A)  $\frac{a+c}{a+b}$  (B)  $\frac{a}{c}$  (C)  $\frac{c}{a}$  (D)  $\frac{a-c}{b}$
52. The body of hydra is cut transversely into three pieces and the middle piece is kept upside down on the substratum. Then,  
(A) it fails to regenerate into an independent hydra.  
(B) it would form tentacles and foot in the same locations as oriented.  
(C) it would form tentacles and foot at the original upper and lower ends.  
(D) it will form a hydra with tentacles at both the ends.
53. Unacceptable odour of water can be removed by filtering it through  
(A) sand (B) activated charcoal (C) alum (D) saw dust
54. The latent heat of fusion of a solid is the quantity of heat in joules required to convert  
(A) 1mg of the solid to liquid, without any change in temperature.  
(B) 1 g of the solid to liquid, without any change in temperature.  
(C) 100g of the solid to liquid, without any change in temperature.  
(D) 1000g of the solid to liquid, without any change in temperature.

55. The signal for mitotic division is generated when the ratio of volume of nucleus to that of cell becomes  
 (A) less than a certain value. (B) greater than a certain value.  
 (C) reaches a certain value. (D) closer to one.
56. Ammonium chloride is purified by  
 (A) sublimation (B) crystallization  
 (C) fractional crystallization (D) distillation
57. The diameter of a solute particle in a solution is :  
 (A)  $\leq 10^{-9}$  m (B)  $> 10^{-9}$  m (C)  $\leq 10^{-3}$  m (D)  $< 10^{-4}$  m
58. AD, BE and CF are the medians of  $\triangle ABC$ . The sum of lengths of segments BE and CF is :  
 (A)  $< \frac{3}{2} BC$  (B)  $> \frac{5}{3} BC$  (C)  $> \frac{3}{2} BC$  (D)  $< \frac{2}{3} BC$
59. In the figure shown, chord ED is parallel to diameter AC of a circle. If  $\angle CBE = 60^\circ$ , then  $\angle DEC$  must be :



- (A)  $15^\circ$  (B)  $30^\circ$  (C)  $10^\circ$  (D)  $20^\circ$
60. Maximum vitamin A content is likely to be found in the extract of  
 (A) sprout of pulse (B) cod liver (C) white muscles (D) rose petals
61. Soaps do not clean clothes in hard water because  
 (A) hard water contains sodium and potassium ions.  
 (B) soluble soap is formed in hard water.  
 (C) the precipitate of soap adheres on to the fibre of the cloth as gummy mass.  
 (D) sodium or potassium soap is formed in hard water.
62. Complete digestive juice having enzymes to digest all types of organic materials is secreted by -  
 (A) salivary gland and pancreatic gland. (B) gastric gland and pancreatic gland.  
 (C) salivary gland and intestinal gland. (D) pancreatic gland and intestinal gland
63. If the pressure of a given mass of a gas is reduced to half and temperature is doubled simultaneously, the volume will be -  
 (A) the same as before (B) twice as before  
 (C) four times as before (D) one fourth as before
64. If  $a^2 + b^2 + c^2 = 1$  and  $p = ab + bc + ca$ , then  
 (A)  $\frac{1}{2} \leq p \leq 2$  (B)  $-\frac{1}{2} \leq p \leq \frac{1}{2}$  (C)  $-\frac{1}{2} \leq p \leq 1$  (D)  $-1 \leq p \leq \frac{1}{2}$
65. The animal in which coelomic fluid has a significant role in locomotion is  
 (A) earthworm (B) leech (C) crab (D) sea cucumber
66. Oxygen exhibits (-1) oxidation state in  
 (A)  $OF_2$  (B)  $H_2O$  (C)  $H_2O_2$  (D)  $HClO$
67. The hypotenuse of a right angled triangle is 10 cm and the radius of its inscribed circle is 1cm. Therefore, perimeter of the triangle is :  
 (A) 22 cm (B) 24 cm (C) 26 cm (D) 30 cm

68. The tissue whose activity is important in vegetative propagation of a plant grafting is -  
 (A) meristem (B) phloem (C) cambium (D) pith
69. If  $x^2 - 5x + 1 = 0$ , then  $\frac{x^{10} + 1}{x^5}$  has the value  
 (A) 2524 (B) 2525 (C) 2424 (D) 2010
70. Which of the following hydroxides is NOT an alkali ?  
 (A) ammonium hydroxide (B) calcium hydroxide  
 (C) copper hydroxide (D) sodium hydroxide
71. The area of a circle is doubled when its radius  $r$  is increased by  $a$ . Therefore, radius  $r$  equals.  
 (A)  $(\sqrt{2} + 1)a$  (B)  $(\sqrt{2} - 1)a$  (C)  $a$  (D)  $(2 - \sqrt{2})a$
72. The product of the roots of the equation  $\sqrt[3]{8+x} + \sqrt[3]{8-x} = 1$  is  
 (A) -21 (B) -189 (C) 9 (D) -5
73. An animal with chitinous exoskeleton, haemocoel and gills belongs to  
 (A) aschminthes (B) Arthropoda (C) echinodermata (D) urochordate
74. The sides of a triangle are in the ratio 6 : 8 : 9 . Therefore :  
 (A) Angles of the triangle are in the ratio 6 : 8 : 9 (B) It is an acute angled triangle  
 (C) It is a right angled triangle (D) It is an obtuse angled triangle
75. The perimeter of an isosceles right angled triangle is  $2p$ . Its area is  
 (A)  $(2 + \sqrt{2})p^2$  (B)  $(2 - \sqrt{2})p^2$  (C)  $(3 - 2\sqrt{2})p^2$  (D)  $(3 + 2\sqrt{2})p^2$
76. A point P is outside a circle at a distance of 13 cm from its centre. A secant from P cuts the circle in Q and R such that QR = 7 cm and the segment PQ of the secant exterior to the circle is 9 cm. Therefore, the radius of circle is :  
 (A) 3 cm (B) 4 cm (C) 5 cm (D) 6 cm
77. The ointment prescribed for burns usually contains, among other ingredients,  
 (A) vitamin A (B) vitamin B (C) vitamin D (D) vitamin E
78. In the figure shown AB is parallel to DE. The difference between angles  $x$  and  $y$  is :



- (A)  $0^\circ$  (B)  $4^\circ$  (C)  $10^\circ$  (D)  $12^\circ$
79. A child having protruding belly, bulging eyes, thin and curved legs and peeling skin is likely to be suffering from  
 (A) kwashiorkor (B) rickets (C) marasmus (D) xerophthalmia
80. If  $\alpha, \beta, \gamma$  are the roots of the equation  $(x - 2)(x^2 + 6x - 11) = 0$ , therefore,  $(\alpha + \beta + \gamma)$  equals :  
 (A) -4 (B)  $23/6$  (C) 13 (D) -8