

NSEJS MOCK TEST – 1

ANSWER KEYS

QP CODE:

Date: November 11, 2018

- | | | | | | | | |
|-----|---|-----|---|-----|---|-----|---|
| 1. | C | 2. | B | 3. | B | 4. | A |
| 5. | B | 6. | B | 7. | A | 8. | B |
| 9. | A | 10. | A | 11. | A | 12. | C |
| 13. | B | 14. | C | 15. | B | 16. | D |
| 17. | D | 18. | A | 19. | C | 20. | D |
| 21. | D | 22. | A | 23. | D | 24. | C |
| 25. | C | 26. | B | 27. | C | 28. | C |
| 29. | A | 30. | C | 31. | B | 32. | B |
| 33. | D | 34. | A | 35. | B | 36. | D |
| 37. | A | 38. | A | 39. | B | 40. | D |
| 41. | A | 42. | C | 43. | C | 44. | A |
| 45. | C | 46. | A | 47. | C | 48. | D |
| 49. | A | 50. | B | 51. | A | 52. | A |
| 53. | B | 54. | A | 55. | B | 56. | C |
| 57. | A | 58. | C | 59. | C | 60. | A |
| 61. | A | 62. | D | 63. | C | 64. | B |
| 65. | C | 66. | B | 67. | B | 68. | B |
| 69. | D | 70. | C | 71. | C | 72. | C |
| 73. | C | 74. | C | 75. | A | 76. | B |
| 77. | A | 78. | C | 79. | C | 80. | C |

HINTS AND SOLUTIONS

1. C

$$1. \quad P = \frac{dRT}{M_w}$$

$$M_w = \frac{dRT}{P} = 56.15 \text{ g/mol}$$

$$E.F = \frac{85.7}{12} : \frac{14.3}{1} = 7.14 : 14.3$$

$$E.F = CH_2$$

$$M.F = (CH_2)_n$$

$$\text{Where } n = \frac{56.15}{12+2} = 4$$

$$M.F = C_4H_8$$

2. B

$$2. \quad \frac{1}{f} = \frac{1}{40} - \frac{1}{25}$$

$$f = -\frac{200}{3}$$

$$P = \frac{1}{f}$$

3. B

3. Because the first and third fractions are equal, adding their numerators and denominators produces another fraction equal to the others: $\frac{((x+4)+(x+5))}{(2+(z-5))} = \frac{(2x+9)}{(z-3)}$. Then

$$y+9 = 2x+9.$$

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

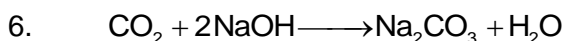
4. A

4. Every odd integer term can be paired with the next even integer, and this pair sums to -1 . There are 1004 such pairs, so the total sum is -1004

5. B

5. Iris and pupil control amount of light entering the eyes.

6. B



$N_{NaOH} = 1$, $\therefore CO_2$ present in mixture = 0.5 and CO present = 0.3 mole

Moles of CO_2 obtained from CO = 0.3, extra moles of NaOH required = $0.3 \times 2 = 0.6$ mole

7. A

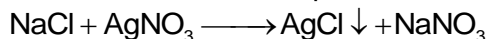
7. Nissl granules are made up of Ribosomes and RNA.

8. B

8. Chymotrypsinogen is produced by Pancreas.

9. A

9. The reaction that takes place is



\therefore 143.5 g of AgCl is produced from 58.5 g NaCl

\therefore 14 g of AgCl will be produced from $\frac{58.5 \times 14}{143.5} = 5.70 \text{ g NaCl}$

This is the amount of NaCl in common salt

$$\% \text{ purity} = \frac{5.70}{6} \times 100 = 95\%$$

10. A

10. Minimum density means rarefaction and time taken between two successive rarefaction is time period(T).

11. A

11. There are three possibilities; the 4th vertex must be opposite one of the three given vertices. These three possibilities have $x = 6$ or $x = 2$ or $x = 0 \Rightarrow \text{sum} = 8$

12. C

12. Note that n contributes n. d (n) digits, where d (n) is the number of digits of n. Then because $1 + \dots + 99 = 4950$, we know that the digits of interest appear amongst copies of two digit numbers. Now for $10 \leq n \leq 99$, the number of digits in the subsequence up to the last copy of n is $1 + 2 + 3 + \dots + 9 + 2 \cdot (10 + \dots + n) = 2 \cdot (1 + \dots + n) - 45 = n^2 + n - 45$.

Since $67^2 + 67 - 45 = 4511$, the two digits are 6 and 7 in some order, so have sum 13.

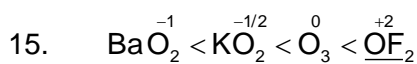
13. B

13. The aperture between right auricle and right ventricle is guarded by one-way valve called Tricuspid valve.

14. C

$$14. \frac{S_{nth}}{S_n} = \frac{U + \frac{1}{2}a(2n-1)}{Un + \frac{1}{2}a \times n^2} = \frac{\frac{a}{2}(2n-1)}{\frac{a}{2}n^2} = \frac{2}{n} - \frac{1}{n^2}$$

15. B



16. D

16. DNA is present in nucleus, chloroplasts and mitochondria.

17. D

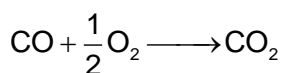
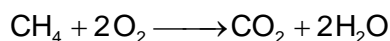
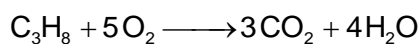
17. Angiosperms contains xylem vessels.

18. A

18. Euplectella is known as Venus flower basket.

19. C

19. 100 mL gaseous mixture contain 20 mL C_3H_8
So, volume of CH_4 and $\text{CO} = (100 - 20) = 80 \text{ mL}$



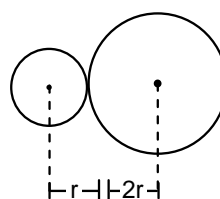
80 mL (CH₄ and CO) will produce 80 mL CO₂; C₃H₈ will produce = 3 × 20 = 60 mL CO₂
 Total CO₂ produced = 80 + 60 = 140 mL

20. **D**

$$\begin{aligned} \bar{V}_{\text{avg}} &= \frac{2 \times 10 \text{ cm}}{30 \text{ min}} \\ &= \frac{2}{3} \text{ cm/min.} \end{aligned}$$

21. **D**

$$\begin{aligned} F &= \frac{G m_1 m_2}{(3r)^2} \\ &= \frac{G \left(\frac{4}{3} \pi r^3 \right) \rho \left(\frac{4}{3} \pi (2r)^3 \right) \rho}{9r^2} \\ F &\propto r^4 \end{aligned}$$



22. **A**

$$\begin{aligned} K_p &= K_c(RT)^{\Delta n} \\ \Delta n &= 3 - 2 = +ve \\ \therefore K_p &> K_c \end{aligned}$$

23. **D**

$$K_{sp} = [\text{A}^{3+}]^2[\text{X}^{2-}]^3 = (2y)^2(3y)^3 = 108 y^5$$

24. **C**

The representation of age pyramid for human population given shows increasing population.

25. **C**

Because the triangles are all similar, they all have the same ratio of perimeter squared to area, or, equivalently, the same ratio of perimeter to the square root of area. Because the latter ratio is 4 for the smallest triangle, it is 4 for all the triangles, and thus their perimeters are 4 . 1, 4 . 3, 4.5,.....4.4, and the sum of these numbers is
 $4(1 + 3 + 5 + \dots + 49) = 4(25^2) = 2500$

26. **B**

Let M be the midpoint of AC. Then triangles AMB, BMC, CMD, and DMA are all right triangles having legs 5 and h for some h. . The area of ABCD is 120, but also 4.
 $\left(\frac{1}{2} \cdot 5 \cdot h \right) = 10h$, so $h = 12$. Then $AB = BC = CD = DA = \sqrt{12^2 + 5^2} = 13$, and the perimeter of ABCD is 52.

27. **C**

“Protein icebergs in a sea of lipids” means Fluid mosaic model.

28. **C**

Upthrust $B = V\rho g$ depends on volume & density of material and in this both are same for both bodies.

29. **A**

$$29. \quad T = \frac{2\pi m}{qB}$$

30. **C**

30. Distance between eye lens and retina does not change.

31. **B**

31. In cell division, spindle fibres are made up of protein Tubulin.

32. **B**

32. Real gas behaves like an ideal gas at low pressure and high temperature at this condition $Z = 1$.

33. **D**

33. Cubing the given equation yields

$$1 = (1 - x^3) + 3\sqrt[3]{(1 - x^3)(1 + x^3)}(\sqrt[3]{1 - x^3} + \sqrt[3]{1 + x^3}) + (1 + x^3) = 2 + 3\sqrt[3]{1 - x^6}$$

$$\text{Then } \frac{-1}{3} = \sqrt[3]{1 - x^6}, \text{ so } \frac{-1}{27} = 1 - x^6 \text{ and } x^6 = \frac{28}{27} \text{ and } x^2 = \frac{\sqrt[3]{28}}{3}.$$

34. **A**

34. From Vieta's relations, we have $p + q + r = 9$, $pq + qr + pr = 8$ and $pqr = -2$.

$$\text{So } \frac{1}{p^2} + \frac{1}{q^2} + \frac{1}{r^2} = \frac{(pq + qr + rp)^2 - 2pqr(p + q + r)}{(pqr)^2} = \frac{8^2 - 2 \cdot 9 \cdot (-2)}{(-2)^2} = 25$$

35. **B**

$$35. \quad \frac{P_1}{T_1} = \frac{P_2}{T_2}$$

36. **D**

36. Coagulation takes place by heating, adding electrolyte and addition of opposite charge colloids.

37. **A**

37. Resistance of 60 W is more than 100 W. $R \propto \frac{1}{A}$

38. **A**

38. Here, slope of graph = $\frac{1}{R}$

\therefore Resistance at $T_1 >$ resistance at T_2

Since resistance is more (for metallic) at higher temperature $T_1 > T_2$.

39. **B**

39. In photosynthesis, there is Oxidation of H_2O .

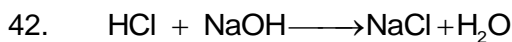
40. **D**

40. pH of blood, Percentage of CO_2 and Partial pressure of oxygen determine the percentage of oxygen carried by Hb.

41. **A**

41. Inverted pyramid is found in biomass pyramid of aquatic system.

42. **C**



2.5 mole 2.49 mole

Case (i) 2.5 mole of HCl required 2.49 mole of NaOH

$$[\text{H}^+] = \frac{0.01}{50} = 2 \times 10^{-4} \text{ M}$$

$$\text{pH} = 4 - \log 2 = 3.7$$

Case (ii) 2.5 mole of HCl required 2.51 mole of NaOH

$$[\text{OH}^-] = \frac{0.01}{50} = 2 \times 10^{-4} \text{ M}$$

$$\text{pOH} = 3.7$$

43. **C**

43. If voltmeter is ideal then whole current will pass through R and value of R would be 5Ω .

44. **A**

44. The measure of the interior angle of a seven pointed star is

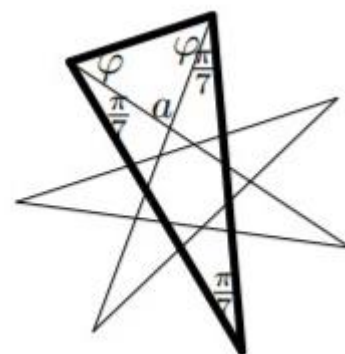
$\frac{180}{7}$ because it is an inscribed angle on the circumcircle which

intercepts a seventh of the circle.

Consider the triangle shown in bold. Because the sum of the angles in any triangle is 180° ,

$$2\phi + 3\left(\frac{180}{7}\right) = 180 = 2\phi + a$$

$$\Rightarrow a = \frac{540}{7}$$



45. **C**

45. $1000000 = 1000^2 = 10^6$.

A number is both a perfect square and a perfect cube if and only if it is exactly a perfect sixth power. So, the answer is the number of perfect squares, minus the number of perfect sixth powers, which is $1000 - 10 = 990$

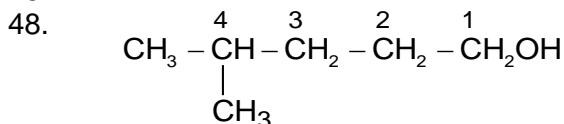
46. **A**

46. $F_1 = \sqrt{F_2^2 + F_3^2}$

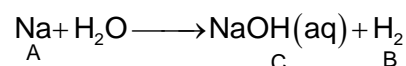
47. **C**

47. Species which can accept as well as donate proton called amphiprotic species.

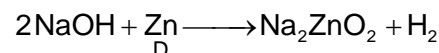
48. **D**



49. **A**



49.



50. **B**

50. $P = F.V$,

\therefore Force is always perpendicular to velocity.

Thus $P = 0$

51. **A**

51. We can re – write the equation as $2^x (2 \cdot (2^x)^2 - 17 \cdot 2^x + 8) = 0$, or

$2 \cdot (2^x)^2 - 17 \cdot (2^x) + 8 = 0$. Make the substitution $y = 2^x$. Then we have $2y^2 - 17y + 8 = 0$,

which has solutions (by the quadratic formula) $y = \frac{17 \pm \sqrt{289 - 64}}{4} = \frac{17 \pm 15}{4} = 8, \frac{1}{2}$, so

$2^x = 8, \frac{1}{2}$ and $x = 3, -1$. The product of these numbers is -3 .

52. **A**

52. $u = 0 \quad t_1 \quad v_0 \quad t_2 \quad v = 0$

$$X = 0 + \frac{1}{2} a_0 t^2$$

a_0 is positive so upward parabola for constant acceleration

$$X = v_0 t_2 - \frac{1}{2} a_0 t_2^2$$

a_0 is negative so downward parabola for retardation.

53. **B**

53. The rapid movement of Na^+ ions from extracellular fluid into the nerve cell leads to Depolarization.

54. **A**

54. Steroid hormones easily pass through plasma membrane by simple diffusion because they are lipid-soluble.

55. **B**

55. We can write this as $(1^3 + 2^3 + \dots + 20^3) - (1^2 + 2^2 + \dots + 20^2)$, which is equal to $44100 - 2870 = 41230$

56. **C**

56. We factor the product as $2^4 \cdot 3^2 \cdot 5 \cdot 7 \cdot 19 \cdot 23$. If x^2 divides this product, then $2^2 \cdot 3 = 12$ is the largest value of x .

57. **A**

57. Number of chromosomes in secondary oocyte stage in human is 23.

58. **C**

58. Energy = power \times time $\Rightarrow 200 \times 10^6 \times 24 \times 60 \times 60 = 1728 \times 10^{10}$ J

59. **C**

59. As $T = 2\pi \sqrt{\frac{l}{g}}$, so T is independent of mass. When a girl sits on a swing along with another girl, only mass on the swing increases but length (l) and acceleration due to gravity (g) remains unchanged. Hence T does not change.

60. **A**

60. $\text{K}^+ = [\text{Ne}]3s^23p^6$

$\text{Ca}^+ = [\text{Ar}]4s^1$

$\text{Ba}^+ = [\text{Xe}]6s^1$

61. A
 61. Size of cation is smaller than its parent atom
 Size of anion is larger than its parent atom, thus order of ionic radii is S^{2-} , Cl^- , K^+ , Ca^{2+}

62. D
 62. Since n always divides $n^2 + n$, the only n that work are divisors of 2. So the possible values of n are 1 and 2 which sum to 3.

63. C

63. Manipulate the equations to get a common denominator; $a = \frac{b+c}{x-2} \Rightarrow x-2 = \frac{b+c}{a}$

$$\Rightarrow x-1 = \frac{a+b+c}{a} \Rightarrow \frac{1}{x-1} = \frac{a}{a+b+c};$$

Similarly, $\frac{1}{y-1} = \frac{b}{a+b+c}$ and $\frac{1}{z-1} = \frac{c}{a+b+c}$.

Thus $\frac{1}{x-1} + \frac{1}{y-1} + \frac{1}{z-1} = 1$

$$(y-1)(z-1) + (x-1)(z-1) + (x-1)(y-1) = (x-1)(y-1)(z-1)$$

$$xy + yz + zx - 2(x+y+z) + 3 = xyz - (xy + yz + zx) + (x+y+z) - 1$$

$$xyz - 2(xy + yz + zx) + 3(x+y+z) - 4 = 0$$

$$xyz - 2(67) + 3(2010) - 4 = 0$$

$$xyz = -5892$$

64. B
 64. To separate miscible liquid Fractional distillation method is used which depends upon B.pt of the liquid mixture.

65. C
 65. Magnification is the ratio of the size of image to the size of the object and if $M > 1$, then image is enlarged.

66. B
 66. $R_{eq} = 20 \Omega$

$$V = IR$$

$$2 = I \times 20$$

$$I = \frac{1}{10} \text{ or } \frac{1}{5 \times 2}$$

$$\text{Thus } n = 2$$

67. B

67. If A is the area of the triangle, the sides are $\frac{2A}{15}$, $\frac{2A}{21}$ and $\frac{2A}{35}$. So the triangle is similar to a

$\frac{1}{15}$, $\frac{1}{21}$, $\frac{1}{35}$ triangle, which is similar to a 3, 5, 7 triangle. Let the sides be $3k$, $5k$ and $7k$.

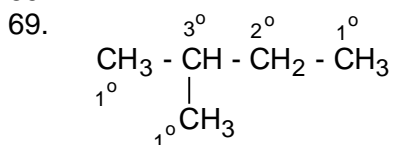
So the area is $\frac{15\sqrt{3}}{4}k^2$. But the area can also be calculate as $\frac{(3k)(35)}{2} = \frac{105k}{2}$. Setting

these values equal, $k = \frac{14\sqrt{3}}{3}$ and the area is $245\sqrt{3}$.

68. **B**

68. Let the other leg have length x . Then the tangents from Y and Z to the incircle have length $x - \frac{3}{8}$ and $3 - \frac{3}{8}$, So the hypotenuse has length $x + \frac{9}{4}$, the semiperimeter of the triangle is $x + \frac{21}{8}$, and the area of the triangle is $\frac{3}{8} \left(x + \frac{21}{8} \right)$. But the area can also be calculated as $\frac{3x}{2}$. Setting these expressions equal, we find $x = \frac{7}{8}$ and the area is $\frac{21}{16}$.

69. **D**



70. **C**

70. Sulphide ores are concentrated by froth flotation method, Galena(PbS).

71. **C**

71. Extraction of highly reactive metals are done by electrolysis

72. **C**

72. The genotypes of the man and woman were BBdd, bbDd

73. **C**

73. When F_1 generation resemble both the parents then it is depicted as Co-dominance.

74. **C**

74. Certain children are immune to certain diseases due to memory cells.

75. **A**

75. The drones in honeybee are fertile males.

76. **B**

76. Logistic growth curve is considered as more realistic one.

77. **A**

77. We can factor the equation as $(a - b^2)(a + b^2) = 41 \times 49$, from which it is evident that $a = 45$ and $b = 2$ is a possible solution. By examining the factors of 2009, one can see that there are no other solutions.

78. **C**

78. Drawing the perpendiculars from the point of intersection of the corners to the bases of the trapezoid, we see that we have similar 3 – 4 – 5 right triangles, we can calculate that the length of the smaller base is 3. Thus the area of the trapezoid is $\frac{8+3}{2} \cdot 5 = \frac{55}{2}$

79. **C**

79.
$$B = \frac{\mu_0 i}{2r}$$

$$i = \frac{q}{t}$$

$$\text{Therefore, } B = \frac{\mu_0(2)(1.6 \times 10^{-19})}{2(0.8)(2)}$$

$$B = 10^{-19} \mu_0$$

80. C

80. For a given area the minimum perimeter occurs for an equilateral triangle. The area of an equilateral triangle with side – length s is $\frac{\sqrt{3}}{4} s^2$, so if the area is $\sqrt{3}$ then $s = \sqrt{\sqrt{3} \frac{4}{\sqrt{3}}} = 2$.

Multiplying by 3 to get the perimeter yields the answer.