FIITJEE

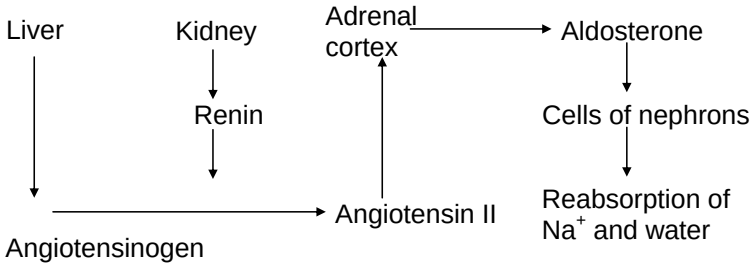
NSEJS MOCK TEST – II

Date: October 30, 2017
QP CODE: 122957.0
ANSWER KEYS

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

HINTS AND SOLUTIONS

1. **B**

1. 

2. C

2. Sponges shows cellular level body organisation.

3. A

3. E = 0 inside a sheet. Therefore, gravitational force on m is zero.

4. C

4. $\omega_1 t + \omega_2 t = 2\pi$

$$(\omega_1)6 + \left(\frac{2\pi}{24}\right)6 = 2\pi$$

or $$6\omega_1 = \frac{3\pi}{2}$$

or $$\omega_1 = \left(\frac{\pi}{4}\right)\frac{\text{rad}}{\text{hr}}$$

5. B

5. Let suppose atomic masses are ‘a’ and ‘b’ respectively then,

$(2a + 3b) \times 0.15 = 15.9$ …(1)

and $(a + 2b) \times 0.15 = 9.3$ …(2)

So, a = 26, b = 18

6. A

6. Molecular mass of mixture ($NO_2 + N_2O_4$) is

$2 \times V.D. = 38.3 \times 2 = 76.6$

Suppose x g of NO_2 is present in 100 g of mixture.

Then moles of NO_2 + moles of N_2O_4 = moles of mixture

$$\frac{x}{46} + \frac{(100 - x)}{92} = \frac{100}{76.6}$$

$x \Rightarrow$ 20.10 g

Hence, moles of NO_2 in mixture = $\frac{20.10}{46}$ = 0.437 mole.

7. C

7. Let $\text{ar}(EFG) = x$

$$\Rightarrow \text{ar}(FGCD) = 3x \text{ and } \text{ar}(AED) = \frac{4x}{3}$$

So, area of Rectangle $= \frac{32x}{3}$

Required Ratio $= \frac{3}{32}$

8. C

8. $a - b = \frac{1^2}{1} + \frac{2^2 - 1^2}{3} + \frac{3^2 - 2^2}{5} + ... + \frac{1001^2 - 1000^2}{2001}$

$= 1001$

9. C

9. Let volume of solution is 100 ml
So, mass of solution = 100 × 1.98 = 198 g
Mass of solute (H_2SO_4) = 90 g
Mass of solvent (water) = 198 – 90 = 108 g.
Hence, molality = $\frac{90}{98} \times \frac{1000}{108}$ = 8.50 m

10. A

10. Mass of NaCl in impure sample = $\frac{250 \times 94.5}{100}$ = 236.25 g

Moles of NaCl = $\frac{236.25}{58.5}$ = 4.04

Moles of pure Na_2SO_4 formed = $\frac{4.04}{2}$ = 2.02

Mass of pure Na_2SO_4 = 2.02 × 142 = 286.84 g

Mass of impure (83.4%) Na_2SO_4 = $\frac{286.84}{0.834}$ = 343.1 g

11. D

11. $T = \sqrt{\frac{GM}{r}}$

T is independent of R, the radius of earth.

12. A

12. Change in kinetic energy = change in potential energy

$\therefore \quad \frac{1}{2}mv^2 = -\frac{GMm}{R+R} - \left(-\frac{GMm}{R}\right)$

$v = \sqrt{\frac{GM}{R}} = \frac{\sqrt{2GM/R}}{\sqrt{2}} = \frac{v_e}{\sqrt{2}}$

where, v_e = escape velocity.

13. B

13. Osteoporosis is the resultant of vitamin D and calcium deficiency.

14. C

14. For clotting of blood platelets and clotting protein are required.

15. D

15. $\Delta P = \rho_{oil}\, g\, h_{oil} + p_w g h_w$

$= (600)(10)\left(10 \times 10^{-2}\right) + (1000)(10)\left(2 \times 10^{-2}\right)$

= 800 N/m^2

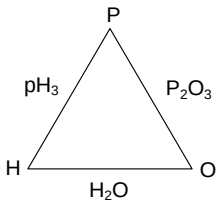
16. B

16. Reading = weight of bucket of water + magnitude of upthrust on block

$$= (10g) + \frac{1}{2}\left(\frac{7.2}{7.2\rho_w}\right)\rho_w g = 10.5\,g = 10.5 \text{ kg}$$

17. B

17. Using the law of reciprocal proportions



18. B

18. For 100 g acid solution of A

$W_{H_2SO_4}$ = 30 , $W_{solution}$ = 100 g

$V_{solution} = \frac{100}{1.218}$ ml

Mass of H_2SO_4 in V ml = $\frac{30 \times 1.218 \times V\ g}{100}$ = 0.3654 V g

For 100 g acid solution of B

$W_{H_2SO_4}$ = 70 g, $W_{solution}$ = 100 g

$V_{solution} = \frac{100}{1.610}$ ml

Mass of H_2SO_4 in V_{ml} acid = $\frac{70 \times 1.610 \times V\ g}{100}$ = 1.127 V g

Total mass of H_2SO_4

= 0.3654 V + 1.127 V = 1.4924 V

Moles of H_2SO_4 = $\frac{1.4924V}{98}$

$V_{solution}$ = V + V = 2V mL = $\frac{2V}{1000}$ L

Molarity = $\frac{1.4924V \times 1000}{98 \times 2V}$ = 7.61 M

Calculation of molality

Mass of solvent (water) = ($2V \times d_{mixture} - 1.4924V$)

= 1.3576 V g

So, molality = $\frac{1.4924V}{98} \times \frac{1000}{1.3576V}$ = 11.22 m

19. C

19. Join centres of 3 big circles to get equilateral triangle having side 2 cm centre of 4th (smaller) circle will be at centroid of triangle

20. D

20. If h is height of cylinder then radius of sphere $= \frac{h}{2}$

Volume of water displaced $= \frac{4}{3}\pi\left(\frac{h}{2}\right)^3$

Let increase in water level = H then $\frac{4}{3}\pi\left(\frac{h}{2}\right)^3 = \pi\left(\frac{h}{2}\right)^2 \times H \Rightarrow H = \frac{2h}{3}$

21. C

21. $\overset{+3}{NO_2^-} + \overset{+7}{MnO_4^-} \xrightarrow{^-OH} \overset{+5}{NO_3^-} + \overset{+4}{MnO_2}$

At end point

$m_{eq}NO_2^- = M_{eq}MnO_4^-$

22. B

22. $2K\overset{+5\ -2}{ClO_3} \longrightarrow 2K\overset{-1}{Cl} + 3\overset{0}{O_2}$

Atoms oxidized and reduced in this reaction is present in same molecule. So, it is an example of intramolecular redox.

23. C

23. With increase in temperature density of the liquid will decrease.

24. B

24. $\Rightarrow \quad \frac{\sin r}{1} = \frac{1}{4/3}$

$\Rightarrow \quad \sin r = 3/4$

Again, $\frac{\sin r}{\sin i} = \frac{\mu_g}{\mu_w}$

$\Rightarrow \quad \frac{3/4}{\sin i} = \frac{\mu_g}{4/3}$

$\Rightarrow \quad \mu_g = \frac{1}{\sin i}$

25. D

25.

Islets of Langerhans

has 2 main types of cells

- β– cells → Secrete insulin —deficiency→ Causes Hyperglycemia
- α– cells → Secrete **Glucagon** —deficiency→ Causes Hypoglycemia

26. D

26. Melanocyte Stimulating Hormone (MSH) responsible for darkening of skin.

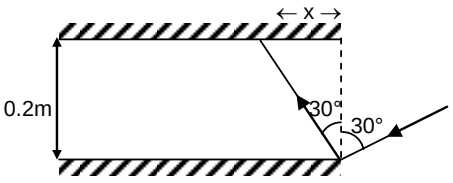
27. B

27. $\tan 30° = \frac{x}{0.2}$

$\frac{1}{\sqrt{3}} = \frac{x}{0.2}$

$n = \frac{0.2}{\sqrt{3}}$

Number of reflections $= \frac{2\sqrt{3}}{x}$



$$= \frac{2\sqrt{3}}{0.2} \times \sqrt{3}$$
$$= 30$$

28. A

28. $m = \frac{1}{n}$

$$\Rightarrow \quad \frac{-v}{u} = \frac{1}{n}$$
$$\Rightarrow \quad -v = \frac{u}{n}$$
$$\Rightarrow \quad v = -\frac{u}{n}$$
$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$
$$\Rightarrow \quad \frac{n}{u} + \frac{1}{u} = \frac{1}{f}$$
$$\Rightarrow \quad u = f(1-n)$$

29. A

29. In metal carbonyls the oxidation state of metal is zero.

30. B

30. C_{rms} of CO_2 = C_{rms} of O_2 at STP

$$\sqrt{\frac{3RT}{44}} = \sqrt{\frac{3R\,273}{32}}$$

On solving T = 375.37 K = 102.38°C

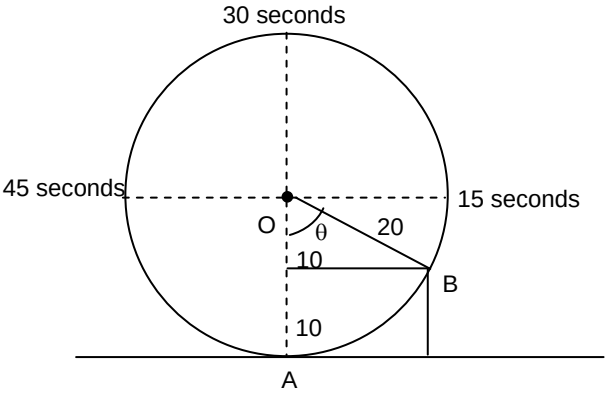
31. D

31. From figure

$$\cos\theta = \frac{1}{2} \Rightarrow \theta = 60^o$$

So, to move from position

A to B time required $= \frac{15}{90} \times 60 = 10\,\text{seconds}$



32. B

32. $n^2T3n + 2 = (n-2)(n-1)$ which is prime for n = 3 and n = 0

33. D

33. $\frac{r_{N_2}}{r_{H_2}} = \sqrt{\frac{M_{H_2}}{M_{N_2}}}$

or, $\frac{V_{N_2} / t_{N_2}}{V_{H_2} / t_{H_2}} = \sqrt{\frac{2}{28}}$

or, $\frac{V_{N_2} / 1hr}{V_{H_2} / t_{H_2}} = \sqrt{\frac{1}{14}}$

$V_{N_2} = V_{H_2}$

$\therefore$ t_{H_2} = 0.267 hr = 0.267 $\times$ 60 = 16.03 min

34. A

34. Using the relation:

$\Delta E = E_2 - E_1$

$= 2.18 \times 10^{-18} \times \left(\frac{1}{\eta_1^2} - \frac{1}{\eta_2^2}\right) \times Z^2$

35. D

35. All of the above are the harmful effects of noise pollution.

36. A

36. λ = 40 cm = 0.4 m

v = 320 m

$f = \frac{v}{\lambda} = \frac{320}{0.40} = 800 \text{ Hz}$

Time $= \frac{1}{f} = \frac{1}{800} \text{sec} = 1.25 \times 10^{-3} \text{ sec}$

37. A

37. Adrenalin is known as emergency hormone.

38. A

38. Presence of canines and molars indicates the omnivorous nature of man.

39. B

39. $v_x = u_x$

$\therefore$ v cos 30° = u cos 60°

or $v = \frac{u}{\sqrt{3}}$

Velocity has become $\frac{1}{\sqrt{3}}$ times. Therefore, kinetic energy will become 1/3 times.

40. D

40. $T_1 = \frac{2u\sin\theta}{g}, T_2 = \frac{2u\cos\theta}{g}$

$R = \frac{2(u\sin\theta)(u\cos\theta)}{g}$

$= \frac{2\left(\frac{gT_1}{2}\right)\left(\frac{gT_2}{2}\right)}{g}$

$= \frac{1}{2} g T_1 T_2$

41. D

41. Using the Planck's concept of energy of radiation

$E = h\nu$

$= \frac{hc}{\lambda}$

ie $E \propto \frac{1}{\lambda}$

42. B

42. $H_2(g) + CO_2(g) \rightleftharpoons H_2O(g) + CO(g)$

0.8 0.8 0 0

0.8 – x 0.8 – x x x

$K_P = \frac{x^2}{(0.8-x)^2} = 4$

On solving, x = 0.533

$\therefore$ Moles of CO_2 = 0.8 – 0.533 = 0.267

Conc. of CO_2 = $\frac{0.267}{5}$ = 0.0534

43. B

43. $f(1) + f(2) = 4f(2) \Rightarrow f(2) = \frac{1}{3}f(1)$

$f(1) + f(2) + f(3) = 6f(3) \Rightarrow f(3) = \frac{4}{15}f(1)$

Similarly $f(4) = \frac{8}{35}f(1)$

$f(5) = \frac{64}{315}f(1)$

$f(6) = 640$

44. B

44. Use Pythagoras Theorem in ΔORQ

45. A

45. $2NaOH + H_2SO_4 \rightleftharpoons Na_2SO_4 + 2H_2O$

Moles $\frac{4}{40}$ $\frac{4.9}{98}$ 0 0

0.1 0.05 0 0

All the acids and bases are consumed.

$\therefore$ pH = 7

46. C

46. $AgCl(s) + aq \rightleftharpoons Ag^+(aq) + Cl^-(aq)$

$NaCl(s) + aq \rightleftharpoons Na^+(aq) + Cl^-(aq)$

Cl^- ion will exhibit common ion effect. Due to common ion effect concentration of Cl^- will increase and concentration of Ag^+ ion will decrease to keep K_{sp} constant.

47. A

47. At the time of overtaking.

$$s_1 = s_2$$

$$\therefore \quad 2ut + \frac{1}{2}at^2 = ut + \frac{1}{2}(2a)t^2$$

$$\therefore \quad t = \frac{2u}{a}$$

$$\therefore \quad (s_1 \text{ or } s_2) = (2u)\left(\frac{2u}{a}\right) + \frac{1}{2}(a)\left(\frac{2u}{a}\right)^2$$

$$= \frac{6u^2}{a}$$

48. D

48. Velocity will first decrease (in magnitude) in negative direction (upwards). Then it will increase in downward (negative direction).

49. A

49. Bacteria cannot survive in a highly salted pickle because they become plasmolysed.

50. D

50. Complete digestive juice having enzymes to digest all types of organic materials is secreted by pancreatic gland and intestinal gland.

51. D

51. $$a = \frac{\text{Net pulling force}}{\text{Total mass}}$$

$$= \frac{10\times10 - 5\times10}{10+5} = \frac{10}{3}\text{m/s}^2$$

5 kg $\quad T - 5\times10 = 5\times a = \frac{50}{3}$

$$\therefore \quad T = \frac{200}{3}\text{N}$$

This is also the reading of spring balance.

52. B

52. $$t = \sqrt{\frac{2S}{a}} \propto \frac{1}{\sqrt{a}}$$

$$\therefore \quad \frac{t_1}{t_2} = \sqrt{\frac{a_2}{a_1}}$$

$$\frac{2}{1} = \sqrt{\frac{g\sin\theta}{g\sin\theta - \mu_K\cos\theta}} = \sqrt{\frac{1}{1-\mu_K}}$$

as, $\quad \sin\theta = \cos\theta \text{ at } 45°$

On solving the above equation, we get

$$\mu_K = \frac{3}{4}$$

53. A

53. Consider the ionization of salt

$$AgBr \rightleftharpoons Ag^+ + Br^-$$

$AgBr \rightleftharpoons Ag^+ + Cl^-$

$Ag_2CO_3 \rightleftharpoons 2Ag^+ + CO_3^{2-}$

$Ag_3ASO_4 \rightleftharpoons 3Ag^+ + AsO_4^{3-}$

Since concentration of anions are constant, so concentration of Ag^+ ion will be different. Hence in case of AgBr salt will be precipitated with lowest value of Ag^+.

54. C

54. Since reaction is exothermic and first step is slowest. So the first step will be r.d.s(rate determining step)

55. C

55. Use angle sum property

56. B

56. Join Q to S then use alternate segment theorem and cyclic quadrilateral property.

57. C

57. $\overset{+8/3}{Mn_3}O_4^{-2} \xrightarrow{\bar{O}H} \overset{+6}{Mn}O_4^{2-}$

Actual change involved in reaction for 2 moles reactant

$6\overset{+8/3}{Mn} + 20e^- \longrightarrow 6\overset{+6}{Mn}$

So, charge required = $20 \times 6.023 \times 10^{23} \times 1.6 \times 10^{-19}$ C.

= 20F

58. B

58. Considering the charge and mass balancing

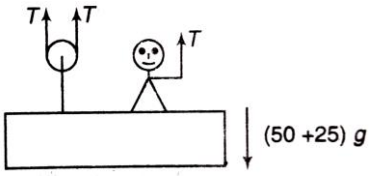
$^{235}_{92}U + ^1_0n \longrightarrow ^{94}_{38}Sr + ^{140}_{54}Xe + 2\,^1_0n$

59. B

59. Steady rate means, net force = 0

$\therefore$ 3T = 75 g = 750

or T = 250 N



60. A

60. (A) Velocity is decreasing. Therefore, acceleration (or net force) is opposite to the direction of motion. (B) and (C) some other forces (other than friction) may also act which retard the motion.

61. D

61. Pepsinogen is secreted by chief cells of stomach.

62. A

62. Partial pressure of O_2 and CO_2 in body.

Gas	Inspired air	Alveolar air	Deoxygenated Blood	Oxygenated Blood	Expired Air	Tissue
O_2	159	104	40	95	116	40
CO_2	40	40	45	40	32	45

63. D

63. Use meanalou's theorem to find BF : FA

64. B

64. $\left(3+2\sqrt{2}\right)^{3/2} - \left(3-2\sqrt{2}\right)^{3/2}$

$= \left\{\left(\sqrt{2}+1\right)^2\right\}^{3/2} - \left\{\left(\sqrt{2}-1\right)^2\right\}^{3/2}$

= 14

65. C

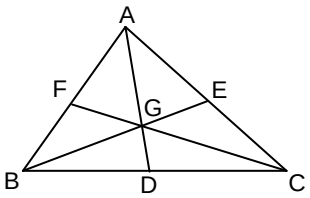
65. Active natural immunity - Direct contact with the pathogens that have entered inside
First line of defence - Surface barriers
Passive natural immunity - Antibodies transferred through the placenta
Second line of defence - Complement proteins and interferon's

66. A

66. Bacillus Calmette Guerin (BCG) vaccine used to prevent Tuberculosis (T.B)

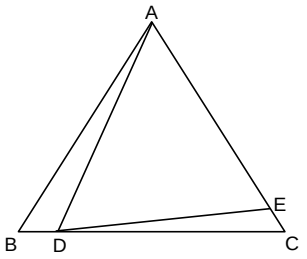
67. C

67. Let $AG = 2x$
then $GD = x$
Given $AG = BC$
$\therefore BD = GD = DC$
$\angle BGC = 90^o$



68. A

68. Let $\angle DCE = y$
and $\angle CDE = x$
then $\angle ADE = \angle AED = x + y$
Now, $2x + y = 40^o + y \Rightarrow x = 20^o$



69. C

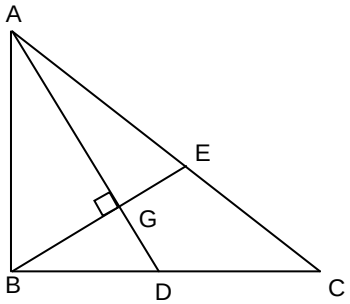
69. During starvation Carbohydrate is used as first respiratory substrate after that fat and then protein used.

70. D

70. Chloroplast and Mitochondria are known as semiautonomous cell organelle.

71. C

71. Let AC = b
then $AE = EC = EB = \frac{b}{2}$ (E is circum – centre of ΔABC)
If 'G' is centroid of ΔABC, then $BG = \frac{b}{3}$ and $GE = \frac{b}{6}$
Also $BC = \sqrt{b^2 - 12} \Rightarrow BD = \frac{\sqrt{b^2-12}}{2}$
$AG = \frac{2}{3}AD = \frac{2}{3}\sqrt{12 + \frac{b^2-12}{4}}$



In ΔAGE, $\frac{b^2+36}{9}+\frac{b^2}{36}=\frac{b^2}{4}$

$\Rightarrow b=6$

72. D

72. O_2 is released during photosynthesis and rate of photosynthesis is affected by the intensity of light.

73. C

73. In metaphase stage the number of chromosome can be counted

74. D

74. $x=0,\ y=0,\ x=4,\ x+y=6$ form a trapezium

Area $=\frac{1}{2}\times 8\times 4=16$ unit^2.

75. C

75. Sum of coefficients of polynomial is f(1) = 0

76. D

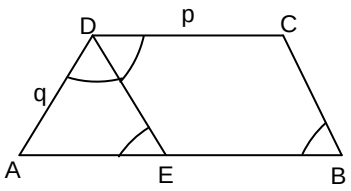
76. Gold fish belongs to phylum chordata.

77. C

77. $\frac{a^2+b^2+c^2}{b^2-ac}=\frac{a^2+b^2+a^2+b^2+2ab}{b^2-a(-a-b)}=\frac{2(a^2+b^2+ab)}{a^2+b^2+ab}=2$

78. A

78. Draw DE which bisects $\angle ADC$
Then $\angle AED = \angle EDC = \angle ADE$
$\Rightarrow$ AE = q also, EB = p
$\therefore$ AB = p + q



79. B

79. Parietal lobe - Sensory perception of heat and cold
Occipital lobe - Decodes and interprets visual information
Frontal lobe - Controls intellectual ability to abstract
Temporal lobe - Decodes and interprets sound

80. D

80. $\angle BAD = 40^o$ & $\angle EBA = 10^o$
$\therefore \angle AHB = 130^o$