

# **FIITJEE**

## **NSEJS MOCK TEST – II**

**Date: October 30, 2017**

**QP CODE: 122957.0**

### **ANSWER KEYS**

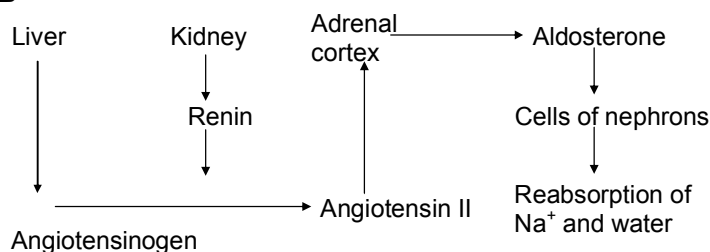
1.	<b>B</b>	2.	<b>C</b>	3.	<b>A</b>	4.	<b>C</b>
5.	<b>B</b>	6.	<b>A</b>	7.	<b>C</b>	8.	<b>C</b>
9.	<b>C</b>	10.	<b>A</b>	11.	<b>D</b>	12.	<b>A</b>
13.	<b>B</b>	14.	<b>C</b>	15.	<b>D</b>	16.	<b>B</b>
17.	<b>B</b>	18.	<b>B</b>	19.	<b>C</b>	20.	<b>D</b>
21.	<b>C</b>	22.	<b>B</b>	23.	<b>C</b>	24.	<b>B</b>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

## HINTS AND SOLUTIONS

1.

**B**

1.



2.

**C**

2.

Sponges show cellular level body organisation.

3.

**A**

3.

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

4.

**C**

4.

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

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

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

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

5.

**B**

5.

Let suppose atomic masses are 'a' and 'b' respectively then,

$$(2a + 3b) \times 0.15 = 15.9 \quad \dots(1)$$

$$\text{and } (a + 2b) \times 0.15 = 9.3 \quad \dots(2)$$

So, a = 26, b = 18

6.

**A**

6.

Molecular mass of mixture (NO<sub>2</sub> + N<sub>2</sub>O<sub>4</sub>) is

$$2 \times \text{V.D.} = 38.3 \times 2 = 76.6$$

Suppose x g of NO<sub>2</sub> is present in 100 g of mixture.Then moles of NO<sub>2</sub> + moles of N<sub>2</sub>O<sub>4</sub> = moles of mixture

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

$$x \Rightarrow 20.10 \text{ g}$$

$$\text{Hence, moles of NO}_2 \text{ in mixture} = \frac{20.10}{46} = 0.437 \text{ mole.}$$

7.

**C**

7.

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

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

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

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

8. C

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

$$= 1001$$

9. C

9. Let volume of solution is 100 ml  
 So, mass of solution =  $100 \times 1.98 = 198 \text{ g}$   
 Mass of solute ( $\text{H}_2\text{SO}_4$ ) = 90 g  
 Mass of solvent (water) =  $198 - 90 = 108 \text{ g}$ .  
 Hence, molality =  $\frac{90}{98} \times \frac{1000}{108} = 8.50 \text{ m}$

10. A

10. Mass of NaCl in impure sample =  $\frac{250 \times 94.5}{100} = 236.25 \text{ g}$   
 Moles of NaCl =  $\frac{236.25}{58.5} = 4.04$   
 Moles of pure  $\text{Na}_2\text{SO}_4$  formed =  $\frac{4.04}{2} = 2.02$   
 Mass of pure  $\text{Na}_2\text{SO}_4 = 2.02 \times 142 = 286.84 \text{ g}$   
 Mass of impure (83.4%)  $\text{Na}_2\text{SO}_4 = \frac{286.84}{0.834} = 343.1 \text{ g}$

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

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

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

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.  $\Delta P = \rho_{\text{oil}} g h_{\text{oil}} + \rho_w g h_w$

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

$$= 800 \text{ N/m}^2$$

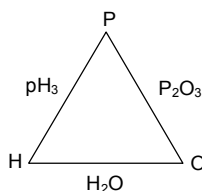
16. B

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

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

17. B

17. Using the law of reciprocal proportions



18. B

18. For 100 g acid solution of A

$$W_{\text{H}_2\text{SO}_4} = 30, \quad W_{\text{solution}} = 100 \text{ g}$$

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

$$\text{Mass of H}_2\text{SO}_4 \text{ in } V \text{ ml} = \frac{30 \times 1.218 \times V \text{ g}}{100} = 0.3654 V \text{ g}$$

For 100 g acid solution of B

$$W_{\text{H}_2\text{SO}_4} = 70 \text{ g}, \quad W_{\text{solution}} = 100 \text{ g}$$

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

$$\text{Mass of H}_2\text{SO}_4 \text{ in } V_{\text{ml}} \text{ acid} = \frac{70 \times 1.610 \times V \text{ g}}{100} = 1.127 V \text{ g}$$

$$\begin{aligned} \text{Total mass of H}_2\text{SO}_4 \\ = 0.3654 V + 1.127 V = 1.4924 V \end{aligned}$$

$$\text{Moles of H}_2\text{SO}_4 = \frac{1.4924V}{98}$$

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

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

Calculation of molality

$$\begin{aligned} \text{Mass of solvent (water)} &= (2V \times d_{\text{mixture}} - 1.4924V) \\ &= 1.3576 V \text{ g} \end{aligned}$$

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

19. C

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

20. D

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

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

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



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

$$= 30$$

28. A

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

$$\Rightarrow \frac{-v}{u} = \frac{1}{n}$$

$$\Rightarrow -v = \frac{u}{n}$$

$$\Rightarrow v = -\frac{u}{n}$$

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\Rightarrow \frac{n}{u} + \frac{1}{u} = \frac{1}{f}$$

$$\Rightarrow u = f(1-n)$$

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

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

On solving  $T = 375.37 \text{ K} = 102.38^\circ\text{C}$

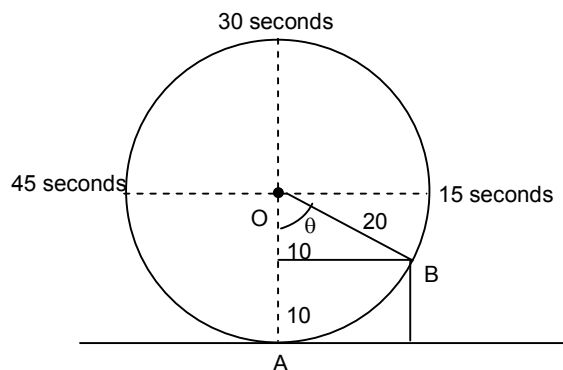
31. D

31. From figure

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

So, to move from position

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



32. B

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

33. D

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

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

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

$$V_{N_2} = V_{H_2}$$

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

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

$$36. \lambda = 40 \text{ cm} = 0.4 \text{ m}$$

$$v = 320 \text{ m}$$

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

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

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

$$39. v_x = u_x$$

$$\therefore v \cos 30^\circ = u \cos 60^\circ$$

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

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

40. D

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

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

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

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

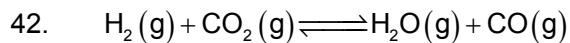
41. D  
41. Using the Planck's concept of energy of radiation

$$E = h\nu$$

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

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

42. B



$$\begin{array}{cccc} 0.8 & 0.8 & 0 & 0 \\ 0.8 - x & 0.8 - x & x & x \end{array}$$

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

On solving,  $x = 0.533$

$$\therefore \text{Moles of CO}_2 = 0.8 - 0.533 = 0.267$$

$$\text{Conc. of CO}_2 = \frac{0.267}{5} = 0.0534$$

43. B

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

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

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

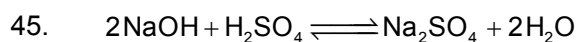
$$f(5) = \frac{64}{315}f(1)$$

$$f(6) = 640$$

44. B

44. Use Pythagoras Theorem in  $\Delta ORQ$

45. A



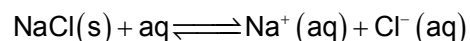
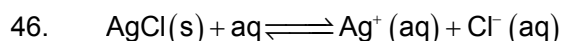
$$\begin{array}{cccc} \text{Moles} & \frac{4}{40} & \frac{4.9}{98} & 0 & 0 \end{array}$$

$$0.1 \quad 0.05 \quad 0 \quad 0$$

All the acids and bases are consumed.

$$\therefore \text{pH} = 7$$

46. C



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



47. A

47. At the time of overtaking.

$$s_1 = s_2$$

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

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

$$\begin{aligned} \therefore (s_1 \text{ or } s_2) &= (2u)\left(\frac{2u}{a}\right) + \frac{1}{2}(a)\left(\frac{2u}{a}\right)^2 \\ &= \frac{6u^2}{a} \end{aligned}$$

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

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

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

$$5 \text{ kg} \quad T - 5 \times 10 = 5 \times a = \frac{50}{3}$$

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

This is also the reading of spring balance.

52. B

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

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

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

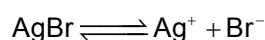
as,  $\sin \theta = \cos \theta$  at  $45^\circ$

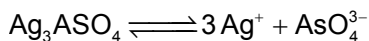
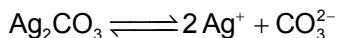
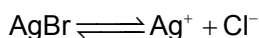
On solving the above equation, we get

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

53. A

53. Consider the ionization of salt





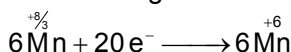
Since concentration of anions are constant, so concentration of  $\text{Ag}^+$  ion will be different. Hence in case of  $\text{AgBr}$  salt will be precipitated with lowest value of  $\text{Ag}^+$ .

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

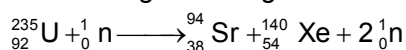
56. B  
 56. Join Q to S then use alternate segment theorem and cyclic quadrilateral property.

57. C  
 57. 
$$\overset{+8/3}{\text{Mn}_3\text{O}_4^{-2}} \xrightarrow{\text{OH}^-} \overset{+6}{\text{MnO}_4^{2-}}$$
  
 Actual change involved in reaction for 2 moles reactant

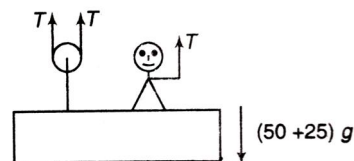


So, charge required =  $20 \times 6.023 \times 10^{23} \times 1.6 \times 10^{-19} \text{ C}$ .  
 = 20F

58. B  
 58. Considering the charge and mass balancing



59. B  
 59. Steady rate means, net force = 0  
 $\therefore 3T = 75 \text{ g} = 750$   
 or  $T = 250 \text{ N}$



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  $\text{O}_2$  and  $\text{CO}_2$  in body.

Gas	Inspired air	Alveolar air	Deoxygenated Blood	Oxygenated Blood	Expired Air	Tissue
$\text{O}_2$	159	104	40	95	116	40
$\text{CO}_2$	40	40	45	40	32	45

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

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

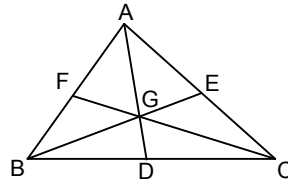
$$= \left\{ (\sqrt{2} + 1)^2 \right\}^{3/2} - \left\{ (\sqrt{2} - 1)^2 \right\}^{3/2}$$

$$= 14$$

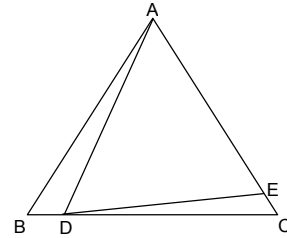
65. C  
 65. Active natural immunity - Direct contact with the pathogens that have entered inside  
 First line of defence - Surface barriers  
 Passive natural immunity - Antibodies transferred through the placenta  
 Second line of defence - Complement proteins and interferon's

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

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



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



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.

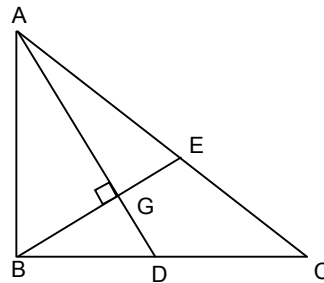
71. C  
 71. Let  $AC = b$   
 then  $AE = EC = EB = \frac{b}{2}$  (E is circum - centre of  $\Delta ABC$ )

If 'G' is centroid of  $\Delta ABC$ , then  $BG = \frac{b}{3}$  and

$$GE = \frac{b}{6}$$

$$\text{Also } BC = \sqrt{b^2 - 12} \Rightarrow BD = \frac{\sqrt{b^2 - 12}}{2}$$

$$AG = \frac{2}{3}AD = \frac{2}{3}\sqrt{12 + \frac{b^2 - 12}{4}}$$



$$\text{In } \triangle AGE, \frac{b^2 + 36}{9} + \frac{b^2}{36} = \frac{b^2}{4}$$

$$\Rightarrow b = 6$$

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

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

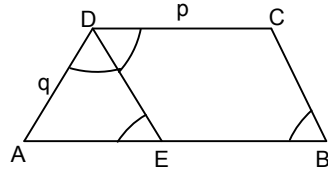
75. C  
 75. Sum of coefficients of polynomial is  $f(1) = 0$

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

