SOLUTIONS

WEEKLY TEST-3

GZPA-1901 & 1902

(JEE ADVANCED PATTERN)

Test Date: 29-07-2017

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PHYSICS

1. (A, D)

2. (A, B)

3. (A, B, C, D)

4. (A, C)

5. (A)

6. (D)

Component of $3\hat{i}+4\hat{j}$ along $\hat{i}+\hat{j}=\frac{\left(3\hat{i}+4\hat{j}\right)\cdot\left(\hat{i}+\hat{j}\right)}{|\hat{i}+\hat{j}|^2}\left(\hat{i}+\hat{j}\right)$

$=\frac{7}{2}\left(\hat{i}+\hat{j}\right)$

7. (A), (B)

8. (A)

9. (B)

10. (A)

11. (A)

12. (B)

13. (D)

14. (C)

15. (C)

16. (B)

17. (A)

18. (D)

19. (C)

A : $\vec{a}+\vec{b}+\vec{c}=0$ (polygon law)

B : $\vec{a}+=$ (Δ law)

C : $\vec{c}+\vec{b}=\vec{a}$ (Δ law)

D : $\vec{c}+\vec{a}=\vec{b}$

20. (A)

CHEMISTRY

21. (A,B,C,D)

$$\frac{nCH_4}{1} = \frac{nO_2}{2} = \frac{nCO_2}{1} = \frac{nH_2O}{2}$$

$$\frac{5}{1} = \frac{nO_2}{2} = \frac{nCO_2}{1} = \frac{nH_2O}{2}$$

$nH_2O = 10$, $mH_2O = 180$ g, $V_{H_2O} = 180\,mL$

22. (A,B,C)

$$\frac{nCH_4}{1} = \frac{nO_2}{2} = \frac{nCO_2}{1} = \frac{nH_2O}{2}$$

$$= \frac{4}{2} = \frac{nCO_2}{1}$$

$nCO_2 = 2$ mol, V(L) of $CO_2 = 44.8$ L at NTP

23. (B, D)

$$1N_2 + 3H_2 \longrightarrow 2NH_3$$

$$\frac{\text{Mole}}{\text{Cooff}}, \frac{2}{1}\frac{3}{3}21$$

H_2 is LR

$$\frac{nN_2}{1} = \frac{nH_2}{3} = \frac{nNH_3}{2}$$

$$\frac{nN_2}{1} = \frac{3}{3} \Rightarrow nN_2 \text{ reacted} = 1 \text{ mole}$$

$$\% \text{ of E.R. reacted } = \frac{1}{2} \times 100 = 50\%$$

24. (A,B,C)

25. (B, D)

26. (B,C,D)

27. (A,B,C)

28. (B,C,D)

29. (A)

30. (A)

31. (C)

32. (A)

Solution of Q.No. : 29 to 32

$$\underset{\substack{174\,g \\ 3\,mole}}{C_4H_{10}} + 6.5\,O_2 \xrightarrow[24]{} \underset{\substack{2.4092\times10 \\ 4\,mole}}{4CO_2} + 5H_2O(l)$$

$$\frac{3}{1} \quad \frac{4}{6.5}, \text{minimum}$$

O_2 is L.R. & C_4H_{10} is E.R.

$$\frac{n_{C_4H_{10}}}{1} = \frac{n_{O_2}}{6.5} = \frac{nCO_2}{4} = \frac{nH_2O}{5}$$

$$\frac{n_{C_4H_{10}}}{1} = \frac{4}{6.5} = \frac{nCO_2}{4} = \frac{nH_2O}{5}$$

$$n_{C_4H_{10}}\ \text{reacted} = \frac{4}{6.5}\text{mole}'$$

$$n_{C_4H_{10}}\ \text{unreacted} = 3 - \frac{4}{6.5} = \frac{15.5}{6.5}$$

$$W_{C_4H_{10}}\ \text{unreacted} = \frac{25.5}{6.5}\times 58\,g$$

$$n_{CO_2} = \frac{16}{6.5}\text{mole}$$

$$V\ (L)\ \text{of}\ CO_2\ \text{at NTP} = \frac{16}{6.5}\times 22.4\,L$$

$$V\ (mL)\ \text{of}\ H_2O = \left(\frac{4\times5}{6.5}\right)\times 18\,mL$$

33. (B)

34. (A)

35. (B)

36. (A)

37. (A)

38. (A)

39. (A)

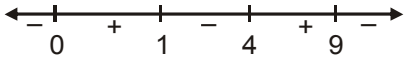
40. (B)

MATHEMATICS

41. (A, B, C, D)

$|x^2-9x|+|x^2-5x+4|>4|x+1|$ is true if

$(9x-x^2)(x^2-5x+4)<0$



$\therefore x\in(-\infty,0)\cup(1,4)\cup(9,\infty)$

42. (A,D)

43. (A,B,C)

44. (A, B)

Combing term from first and last postions

$$\left(\frac{1}{x}+\frac{1}{x+7}\right)-\left(\frac{1}{x+1}+\frac{1}{x+6}\right)+\left(\frac{1}{x+2}+\frac{1}{x+5}\right)-\left(\frac{1}{x+3}+\frac{1}{x+4}\right)>0$$

$$\frac{2x+7}{x(x+7)}-\frac{2x+7}{(x+1)(x+6)}+\frac{2x+7}{(x+2)(x+5)}-\frac{2x+7}{(x+3)(x+4)}>0$$

$$(2x+7)\left(\frac{1}{x(x+7)}-\frac{1}{x^2+7x+6}\right)+(2x+7)\left(\frac{1}{x^2+7x+10}-\frac{1}{x^2+7x+12}\right)>0$$

$$(2x+7)\frac{6}{(x^2+7x)(x^2+7x+6)}+(2x+7)\frac{2}{(x^2+7x+10)(x^2+7x+12)}>0$$

$$\Rightarrow \quad \frac{2x+7}{x(x+1)(x+2)(x+3)(x+4)(x+5)(x+6)(x+7)}>0$$

45. (A, B)

Maximum value of $n(A\cup B)=M=n(A)+n(B)=5+3=8$

Minimum value of $n(A\cup B)=m=n(A)=5$.

46. (A,B)

47. (B, C)

$2x - x^2 + 11 \geq x^2 + 2x + 3$

$2x^2 - 8 \leq 0$

$x^2 - 4 \leq 0$

$x \in [-2, 2]$

48. (A, B)

49. (C)

Since 2m – n = 3 has the solution m = 4

and $a_5 - (a_1 + a_2 + a_3 + a_4) = 9 - (1 + 3 + 4 + 7) = -6 < 5$

$\therefore$ there are 2 solutions.

50. (A)

Since 2m – n = 2 is not possible

but 2m – n + 1 = 2 has the solution m = 3 and $2 < 5$ and $10 - (1 + 3 + 4) = 2 > 1$

$\therefore$ there is no solution.

51. (C)

$(x-8)(x+8) \le 0$

$\Rightarrow x \in [-8, 8]$

52. (D)

$(x^2 - 2x + 1)(x^2 + 1) \le 0$

$(x-1)^2(x^2+1) \le 0$

$\therefore x = \{1\}$

53. (D)

$|x^3 - x| + |2 - x| = (x^3 - x) - (2 - x)$

$\therefore$ $x^3 - x \ge 0$ and $2 - x \le 0$

$x^3 - x \ge 0$ and $x \ge 2$

$x(x^2 - 1) \le 0$ and $x \ge 2$

$\therefore$ $x \in [2, \infty)$

54. (B)

$(x^2 - x)(x + 3) \le 0$

$x(x - 1)(x + 3) \le 0$

$x \in (-\infty, -3] \cup [0, 1]$

55. (B)

$$\frac{2}{3} \le x \le \frac{4}{5} \Rightarrow \frac{3}{2} \ge \frac{1}{x} \ge \frac{5}{4} \Rightarrow 6 \ge \frac{4}{x} \ge 5 \Rightarrow 3 \ge \frac{4}{x} - 3 \ge 2$$

$$\Rightarrow 2 \le \frac{4 - 3x}{x} \le 3$$

56. (A)

$$-3 < \frac{2x-7}{x} < -1$$

$$\Rightarrow -5 < -\frac{7}{x} < -3 \Rightarrow 5 > \frac{7}{x} > 3$$

$$\Rightarrow \frac{5}{7} > \frac{1}{x} > \frac{3}{7} \Rightarrow \frac{7}{5} < x < \frac{7}{3}$$

57. (D)

(P) $\dfrac{5x+1-x^2-2x-1}{(x+1)^2} < 0$

$-x^2 + 3x < 0,\ x \neq -1$

$x(x-3) > 0,\ x \neq -1$

$\therefore \quad x \in (-\infty, -1) \cup (-1, 0) \cup (3, \infty)$

(Q) $|x| + |x-3| = \begin{cases} -2x+3 & : x < 0 \\ 3 & : 0 \le x \le 3 \\ 2x-3 & : x > 3 \end{cases}$

$\therefore \quad x \in (-\infty, 0) \cup (3, \infty)$

(R) $\dfrac{1}{|x|-3} - \dfrac{1}{2} < 0 \quad \Rightarrow \quad \dfrac{2-|x|+3}{2(|x|-3)} < 0$

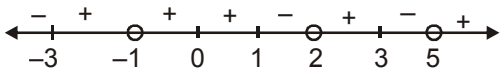
$(5-|x|)/(|x|-3) < 0 \quad \Rightarrow \quad |x| < 3 \text{ or } |x| > 5$

$\Rightarrow \quad x \in (-\infty, -5) \cup (-3, 3) \cup (5, \infty)$

(S) $\dfrac{x^4}{(x-2)^2} > 0 \quad \Rightarrow \quad x \in (-\infty, 0) \cup (0, 2) \cup (2, \infty)$

58. (B)

Wavy curve for f(x)



59. (A)

60. (C)

By using definition of mudulus, greatest integer and fractional part function, obviously.