JEE EXPERT

RANK ELEVATOR TEST SERIES

(RETS/PT-03)
12TH (Zenith X01 & X02)
Date 29.09.2019
BOOKLET CODE - [A & B]

ANSWER KEY

PHYSICS			CHEMISTRY			MATHEMATICS		
Q. No.	B. Code (A)	B. Code (B)	Q. No.	B. Code (A)	B. Code (B)	Q. No.	B. Code (A)	B. Code (B)
1.	A	A	26.	B	B	51.	C	D
2.	B	B	27.	D	D	52.	B	B
3.	A	C	28.	B	C	53.	D	B
4.	A	D	29.	D	A	54.	C	C
5.	A	B	30.	B	C	55.	C	B
6.	D	A	31.	A	C	56.	B	B
7.	D	A	32.	C	A	57.	C	D
8.	D	B	33.	A	B	58.	D	B
9.	B	A	34.	C	C	59.	D	C
10.	B	D	35.	C	D	60.	B	C
11.	D	B	36.	C	B	61.	B	A
12.	A	D	37.	D	B	62.	D	D
13.	D	A	38.	C	C	63.	D	C
14.	D	D	39.	C	D	64.	C	C
15.	D	A	40.	B	D	65.	B	D
16.	B	D	41.	D	C	66.	A	B
17.	A	D	42.	D	B	67.	C	C
18.	B	D	43.	D	D	68.	B	C
19.	C	B	44.	B	D	69.	A	D
20.	D	D	45.	C	C	70.	C	A
21.	(0021)	(0005)	46.	(0001)	(0004)	71.	(0004)	(0006)
22.	(0140)	(0002)	47.	(0003)	(0010)	72.	(0003)	(0005)
23.	(0002)	(0025)	48.	(0004)	(0002)	73.	(0003)	(0003)
24.	(0005)	(0140)	49.	(0002)	(0001)	74.	(0006)	(0004)
25.	(0022)	(0022)	50.	(0010)	(0003)	75.	(0005)	(0003)

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Solution

PART - III Mathematics

51./63 Sol. (C)

Consider the function

$g(x) = f(x) - x^2$

$g(0) = g(\pi) = g(2\pi) = 0$

$\Rightarrow f'(x) - 2x = 0$ has two real roots in $(0, 2\pi)$ and $f''(x) - 2 = 0$ has atleast one root in $(0, 2\pi)$

52/66. Sol. (B)

From the given condition

$P(x) = x^3 - 6x^2 + 11x$

Which is on to but not one-one.

$$\int_{-1}^{1} P(x)dx = 6$$

53/65. Sol. (D)

$f'(x) \geq 3$ and $f(0) = 2 \Rightarrow f(x) \geq 3x + 2 \ \forall x \in [0, 10]$

54/64. Sol. (C)

$$f(x) = \int_{-1/2}^{x^2+1} (t-2)(t-5)(t-10)dt$$

$f'(x) = 2x(x^2 - 1)(x^2 - 4)(x^2 - 9)$

Point of maxima $\rightarrow -2, 0, 2$

Point of minima $\rightarrow -3, -1, 1, 3$

55/67. Sol. (C)

$F(f(x)) = x \Rightarrow g(x) = x$ and $x^2 - 2x + 2 = (x-1)^2 + 1 \geq 1 \Rightarrow K = \frac{\pi}{2} + \frac{\pi}{4} = \frac{3\pi}{4}$

56/52. Sol. (B)

Circumcenter is fixed $\Rightarrow$ A lying on a circle.

$\Rightarrow$ locus of centroid will be a circle.

57/68. Sol. (C)

58/69. Sol. (D)

Let α & β be the roots

$$1+\frac{b}{a}+\frac{c}{a}=n \text{ (a prime)}$$

$\Rightarrow$ $1+\alpha\beta-\alpha-\beta$ = a prime

$\Rightarrow$ $(\alpha-1)(\beta-1)$ = a prime $\Rightarrow \alpha = 2$ & $\beta = 3$

$$\int_2^3 (3x^2-2x+1)\,dx = 15$$

&

$a = 1 \Rightarrow b = -5 \;\; c = 6$

$$\int_{-5}^{7} \frac{e^{|x-1|}(x-1)}{(x-1)^2+2}\,dx = \int_{-6}^{6} \frac{e^{|x|}x}{x^2+2}\,dx = 0$$

59/51. Sol. (D) **60/53. Sol. (B)** **61/55. Sol. (B)** 62**/62. Sol. (D)**

63**/57. Sol. (D)** 64**/60. Sol. (C)**

65/58. **Sol. (B)**

$\phi'(x) = f(x)$

$\phi(x)$ is a periodic function with period T.

Because $f(x)$ has the period T.

66/61. **Sol. (A)** $f(x)=\begin{cases} -x^2 & , \quad x\le -1 \\ 2+[x]+[-x] & , \quad -1<x<1 \\ -x^2 & , \quad x\ge 1 \end{cases}$ Þ $f(x)=\begin{cases} -x^2 & , \quad x\le -1 \\ 1 & , \quad -1<x<0 \\ 2 & , \quad x=0 \\ 1 & , \quad 0<x<1 \\ -x^2 & , \quad x\ge 1 \end{cases}$

Thus $f(x)$ is an even function. Þ $\int_{-2}^{2} f(x)\,dx = 2\int_0^2 f(x)\,dx$

$$= 2\left(\int_0^1 f(x)\,dx + \int_1^2 f(x)\,dx\right) = 2\left(1-\left.\frac{x^3}{3}\right|_1^2\right) = 2\left(1-\frac{7}{3}\right) = -\frac{8}{3}$$

67/54. Sol. (C)

68/**56. Sol. (B)**

LHS of given equation is always positive.

And RHS is always negative as discriminant is less than 0 and coefficient of x^2 is -1.

$\therefore$ No solution.

69/70**. Sol. (A)**

Let $f(x) = ax^2 + bx - 5$, since $f(x) = 0$ does not have two distinct real roots, so either $f(x) \geq 0$ or $f(x) \leq 0$ for all real x. But $f(0) = -5$ so $f(x) \leq 0$.

$\Rightarrow \quad f(-5) \leq 0$

$\Rightarrow \quad 25a - 5b - 5 \leq 0$

$\Rightarrow \quad 5a - b \leq 1.$

70/59**. Sol. (C)**

We have $\alpha + \beta = -a$, so $\frac{\alpha+\beta}{2} = -\frac{a}{2}$. Thus $f'\left(-\frac{a}{2}\right) = 2\left(-\frac{a}{2}\right) + a = 0$.

<u>Numerical Value Type Question : 71 to 75</u>

71/74. Sol. 000**4**

The equation f(x) = 0 has one negative and two positive roots and. f'(x) = 0 has 2 positive roots.

72/75. Sol. (0003)

$x^2 + ax + b = cx^2 + cx + 1$

$\Rightarrow (1 - c)x^2 + (a - c)x + (b - 1) = 0$ has 3 real roots.

$\Rightarrow 1 - c = a - c = b - 1 = 0$

73/73. Sol. (0003)

For continuous function two consicutive maxima or minima can not occure.

74/71. Sol. (0006)

Let h(x) = f(x) – (3x + 2) = 0 has 5 roots

$h'(x) = f'(x) - 3 = 0$ 4 roots

$h''(x) = f''(x) = 0$ 3 roots

$\Rightarrow (f'(x) - 3)\, f''(x) = 0$ 7 roots

75/75. Sol. (0005)

Sol. $I = \int_1^2 \frac{f(x)}{x}dx$ put $x = \frac{4}{t}$; $I = -\int_4^2 \frac{f\left(\frac{4}{t}\right)dt}{t} = \int_2^4 \frac{f(x)}{x}dx \Rightarrow 2I = \int_1^2 \frac{f(x)}{x}dx + \int_2^4 \frac{f(x)}{x}dx = \int_1^4 f(x)dx$

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