

JEE(Main) : LEADER TEST SERIES / JOINT PACKAGE COURSE

Test Type : Major Test

ANSWER KEY**PART-1 PHYSICS**

SECTION-I	Q.	1	2	3	4	5	6	7	8	9	10
	A.	C	A	C	C	C	B	C	D	A	D
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	D	C	D	D	A	A	B	C	D	A
SECTION-II	Q.	1	2	3	4	5	6	7	8	9	10
	A.	1.60	500.00	1.70	6.80	0.50	26.00	60.00	7.14	12.00	396.00

PART-2 CHEMISTRY

SECTION-I	Q.	1	2	3	4	5	6	7	8	9	10
	A.	B	B	D	D	D	C	C	C	C	D
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	C	B	B	B	D	B	C	B	B	A
SECTION-II	Q.	1	2	3	4	5	6	7	8	9	10
	A.	4.00	3.00	2.00	6.00	8.00	45.00	500.00	100.00	250.00	3.00

PART-3 MATHEMATICS

SECTION-I	Q.	1	2	3	4	5	6	7	8	9	10
	A.	C	C	B	A	C	B	D	B	D	C
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	D	C	D	C	B	C	B	D	B	C
SECTION-II	Q.	1	2	3	4	5	6	7	8	9	10
	A.	10.00	18.00	2160.00	17.00	1.00	7.00	1.16	5.00	2.00	108.00

HINT - SHEET**PART-1 : PHYSICS****SECTION-I**

1. Reynolds Number = $\frac{\rho v d}{\eta}$

Volume flow rate = $v \times \pi r^2$

$$v = \frac{100 \times 10^{-3}}{60} \times \frac{1}{\pi \times 25 \times 10^{-4}}$$

$$v = \frac{2}{3\pi} \text{ m/s}$$

$$\text{Reynolds Number} = \frac{10^3 \times 2 \times 10 \times 10^{-2}}{10^{-3} \times 3\pi} \approx 2 \times 10^4$$

order 10^4

2. $-ms \frac{dT}{dt} = e\sigma A (T^4 - T_0^4)$

$$-\frac{dT}{dt} = \frac{e\sigma A}{ms} (T^4 - T_0^4)$$

$$-\frac{dT}{dt} = \frac{4e\sigma AT_0^3}{ms} (\Delta T)$$

$$T = T_0 + (T_i - T_0)e^{-kt}$$

$$\text{where } k = \frac{4e\sigma AT_0^3}{ms}$$

$$k = \frac{4e\sigma AT_0^3}{\rho v s}$$

$$\left| \frac{dT}{dt} \right| \propto k$$

$$\therefore \left| \frac{dT}{dt} \right| \propto \frac{1}{\rho s}$$

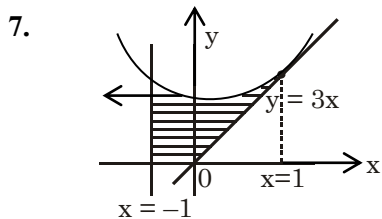
$$\rho_A s_A = 2000 \times 8 \times 10^2 = 16 \times 10^5$$

$$\rho_B s_B = 4000 \times 10^3 = 4 \times 10^6$$

$$\rho_A s_A < \rho_B s_B$$

5.
$$\lim_{x \rightarrow 0} \frac{x \tan^2 2x}{\tan 4x \sin^2 x} = \lim_{x \rightarrow 0} \frac{x \left(\frac{\tan^2 2x}{4x^2} \right) 4x^2}{\left(\frac{\tan 4x}{4x} \right) 4x \left(\frac{\sin^2 x}{x^2} \right) x^2} = 1$$

6. $f(x) = 3x^2 - 6(a - 2)x + 3a$
 $f(x) \geq 0 \forall x \in (0, 1]$
 $f(x) \leq 0 \forall x \in [1, 5)$
 $\Rightarrow f(x) = 0$ at $x = 1 \Rightarrow a = 5$
 $f(x) - 14 = (x - 1)^2 (x - 7)$
 $\frac{f(x) - 14}{(x - 1)^2} = x - 7$



$$= \int_{-1}^0 (x^2 + x + 1) dx + \int_0^1 [(x^2 + x + 1) - 3x] dx$$

$$= \frac{7}{6}$$

8.
$$\int_0^1 0 dx + \int_1^2 (x - 1) dx + \int_2^3 2(x - 2) dx + \int_3^4 3(x - 3) dx + \int_4^5 4(x - 4) dx$$

$$= 5.00$$

9. Here $C_1 C_2 = \sqrt{47}$, $r_1 + r_2 = 8$ and $|r_1 - r_2| = 2$
 $\Rightarrow |r_1 - r_2| < C_1 C_2 < r_1 + r_2 \Rightarrow$ two common tangents.

10. Normal at $P(t_1^2, 2t_1)$ on the parabola $y^2 = 4x$... (i)
 Meets it again at the point $Q(t_2^2, 2t_2)$,
 where $t_2 = -t_1 - \frac{2}{t_1}$... (ii)

If subtends a right angle at the vertex $(0, 0)$ then
 (Slope of OP) (Slope of OQ) = -1
 $\Rightarrow \frac{2t_1}{t_1^2} \cdot \frac{2t_2}{t_2^2} = -1 \Rightarrow t_2 = \frac{-4}{t_1}$... (iii)

From (ii) and (iii), $-t_1 - \frac{2}{t_1} = \frac{-4}{t_1}$
 $\Rightarrow -t_1 = -\frac{2}{t_1}$
 $\Rightarrow t_1^2 = 2 \Rightarrow t_1 = \pm\sqrt{2} \therefore t_2 = \mp 2\sqrt{2}$
 $\therefore P$ and Q are $(2, \pm 2)$ and $(8, \mp 4\sqrt{2})$
 $\therefore PQ = \sqrt{(8 - 2)^2 + (\mp 4\sqrt{2} \mp 2\sqrt{2})^2} = \sqrt{36 + 72}$
 $= \sqrt{108} = 6\sqrt{3}$.