# Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

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| Sec: Sr.IPLCO | JEE–ADVANCE | Date: 15-11-15 |
| Time: 3 Hours | 2011-P2-Model | Max Marks: 240 |

## KEY & SOLUTIONS

### CHEMISTRY

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D | 2 | A | 3 | A | 4 | C | 5 | D | 6 | A |
| 7 | A | 8 | D | 9 | AB | 10 | AB | 11 | ABCD | 12 | ABD |
| 13 | 6 | 14 | 4 | 15 | 5 | 16 | 4 | 17 | 7 | 18 | 4 |
| 19 | A – P, S,T;<br>B – Q,R,T;<br>C – P,T;<br>D – Q,R,T | 20 | A – P,R,S,T;<br>B –P,Q,R,S,T;<br>C – P,Q,T;<br>D – P,Q,T | | | | | | | | |

### PHYSICS

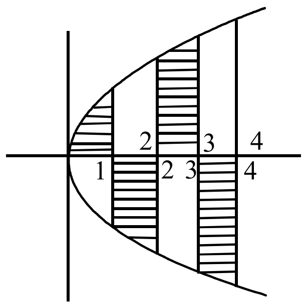
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | C | 22 | B | 23 | C | 24 | B | 25 | C | 26 | B |
| 27 | A | 28 | C | 29 | BD | 30 | ABD | 31 | AC | 32 | ABD |
| 33 | 7 | 34 | 4 | 35 | 2 | 36 | 9 | 37 | 5 | 38 | 2 |
| 39 | A-P,R;<br>B- S;<br>C-P,Q,R;<br>D-P,R | 40 | A-P,Q;<br>B-R,S;<br>C-Q,R;<br>D-Q,R | | | | | | | | |

### MATHEMATICS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | B | 42 | A | 43 | B | 44 | A | 45 | C | 46 | B |
| 47 | C | 48 | A | 49 | AC | 50 | AC | 51 | BD | 52 | ABCD |
| 53 | 0 | 54 | 4 | 55 | 4 | 56 | 4 | 57 | 7 | 58 | 2 |
| 59 | A - Q ;<br>B - S ;<br>C - P ;<br>D - P | 60 | A - Q ;<br>B - R ;<br>C - S ;<br>D - P | | | | | | | | |

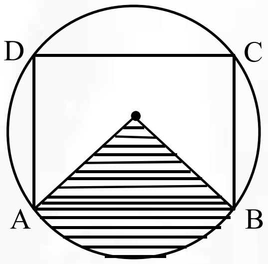
# MATHS

41.




required area $= 4\int_0^4 \sqrt{x}dx = \frac{64}{3}$

42.




required area $= \frac{\pi r^2}{4} = \frac{\pi 4^2}{4} = 4\pi$

43. $\frac{dy_1}{dx} + f(x)y_1 = 0 \Rightarrow f(x) = \frac{-1}{y_1}\frac{dy_1}{dx}$

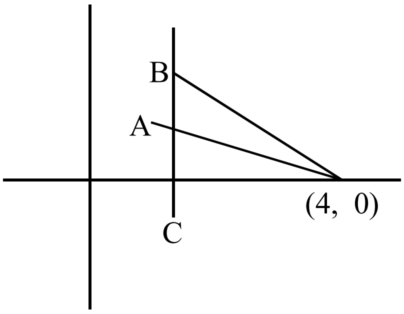
$\frac{dy}{dx} - \frac{1}{y_1}\frac{dy_1}{dx}.y = r(x)$

$e^{-\int \frac{1}{y_1}dy} = \frac{1}{y_1}$

$\frac{d}{dx}\left(\frac{y}{y_1}\right) = \frac{r(x)}{y_1} \Rightarrow \frac{y}{y_1} = \int \frac{r(x)dx + c}{y_1}$

$y = y_1\int \frac{r(x)}{y_1}dx + cy_1$

44. $A = \sqrt{2}\int_2^4 \sin\left(\frac{\pi x}{4}\right)dx = \frac{4\sqrt{2}}{\pi}$




Let the line $L_1 = 0$

Be $y - m_1(x-4) = 0$ & $L_2 = 0 : y - m_2(x-4) = 0$

$A(2, 2m_1),\ B(2-2m_2)$

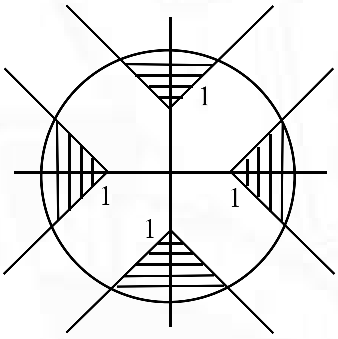
$\Delta ACD = \frac{\Delta}{3} \Rightarrow m_1 = \frac{-2\sqrt{2}}{3\pi}$

$m_2 = \frac{-4\sqrt{2}}{3\pi}$

45. $d\left(x^2e^y\right) + d\left(\frac{x^2}{y}\right) + d\left(\frac{x}{y^3}\right) = 0$

$\Rightarrow x^2e^y + \frac{x^2}{y} + \frac{x}{y^3} = e$

46.




required area $= 8\left\{\frac{1}{2}.1.1 + \int_2^{\sqrt{5}} \sqrt{5-x^2}\,dx\right\}$

49. required area

$\frac{1}{2}xy + \int_a^b \frac{b}{a}\sqrt{a^2-x^2}\,dx$

$= \frac{1}{2}x\frac{b}{a}\sqrt{a^2-x^2} + \int_a^b \frac{b}{a}\sqrt{a^2-x^2}\,dx = \frac{ab}{2}\cos^{-1}\left(\frac{x}{a}\right)$

50. a) $A=\int_a^c \left(f(c)-f(x)\right)dx+\int_c^b \left(f(x)-f(c)\right)dx$

$\frac{dA}{dc}=0 \Rightarrow c=\frac{a+b}{2}$

c) $f'(x)=x(x-2)<0 \ in \ (0,2)$

$\therefore x=\frac{0+2}{2}=1$

$\Rightarrow f(1)=\frac{1}{3}-1+a=0 \Rightarrow a=2/3$

51. solution of the differential equation $y=\left(\frac{x-2}{x-3}\right)^2\left(x+\frac{1}{x-2}+C\right)$

53. $\frac{dy}{y}=\left(\frac{2n}{x\log x}+1\right)dx$

$\Rightarrow \log y=2n\log\left(|\log x|\right)+x+c \ \& \ c=0$

$y=|\log x|^{2n}.e^x=f(x)$

54. $\frac{ydx-xdy}{y^2}+\left(\frac{x}{y}+1\right)\sqrt{\frac{x}{y}}\left(d\left(\frac{x^2+y^2}{2}\right)\right)=0$

$\Rightarrow d\left(\frac{x^2+y^2}{2}\right)+\frac{d\left(\frac{x}{y}\right)}{\left(1+\frac{x}{y}\right)\sqrt{\frac{x}{y}}}=0$

$\Rightarrow \frac{x^2+y^2}{2}+2\tan^{-1}\left(\sqrt{\frac{x}{y}}\right)=C$

$(1,1)$ lies on it $\Rightarrow c=1+\frac{\pi}{2}$

55. $\frac{d(xy)}{x^2y^2}=\frac{y.d\left(\frac{y}{x}\right)}{x}$

$\Rightarrow \frac{y^2}{2x^2}+\frac{1}{xy}=c \ \& \ x=1 \ \& \ y=(-2)^{1/3}$

$\Rightarrow y^3=-2x \ \& \ f^{-1}(-2)=4$

56. (where [.], denotes greatest integer function)

Let $A = \int_0^2 y\,dx$

$$\frac{dy}{dx} = y + A$$

$$\Rightarrow \ln(y + A) = x + B,\ y(0) = 1 \Rightarrow B = \ln(1 + A)$$

$$A = \int_0^2 \left((1 + A)e^x - A\right)dx \Rightarrow A = \frac{e^2 - 1}{4 - e^2}$$

$$\therefore y(x) = \frac{3e^x - e^2 + 1}{4 - e^2}$$

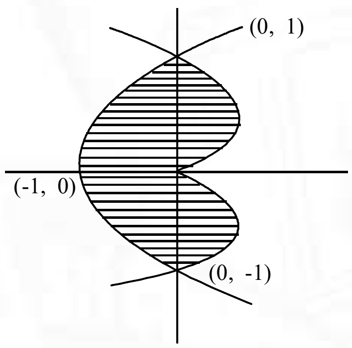
$$y(2) = \frac{2e^2 + 1}{4 - e^2}$$

$$\left[\left|y(2)\right|\right] = 4$$

57. $$g(x) = \underset{n\to\infty}{Lt}.\frac{1}{50}f(x) = \begin{cases} \to\infty & if \quad x < 1/e \\ 0 & if \quad \frac{1}{e} < x < e \\ \to\infty & if \quad x > e \end{cases}$$

$$\therefore \int_{1/e}^{e} g(x)\,dx = 0$$

58.




(required area is $A = 2\int_0^1 \left(y\sqrt{1 - y^2} - \left(y^2 - 1\right)\right)dy$

$=2$