AIEEE MODEL EXAM (TEST-3)

XII Pass(8-9 Pass) Batches

Key, Hints/ Solution

MATHEMATICS		CHEMISTRY		PHYSICS	
Q. No.	Answer	Q. No.	Answer	Q. No.	Answers
1	C	36	A	71	C
2	C	37	A	72	C
3	B	38	D	73	D
4	A	39	B	74	C
5	B	40	B	75	C
6	D	41	A	76	C
7	A	42	B	77	C
8	B	43	C	78	B
9	D	44	C	79	D
10	D	45	A	80	A
11	A	46	A	81	B
12	A	47	B	82	A
13	A	48	A	83	D
14	A	49	A	84	D
15	A	50	A	85	D
16	A	51	C	86	C
17	B	52	D	87	C
18	C	53	D	88	B
19	C	54	B	89	D
20	D	55	B	90	B
21	A	56	B	91	A
22	A	57	A	92	D
23	C	58	D	93	B
24	C	59	B	94	D
25	D	60	B	95	C
26	C	61	B	96	C
27	C	62	B	97	D
28	D	63	A	98	D
29	C	64	B	99	A
30	A	65	C	100	B
31	B	66	A	101	A
32	C	67	B	102	B
33	A	68	A	103	B
34	A	69	B	104	C
35	C	70	A	105	A

HINTS & SOLUTIONS

Mathematics, Physics, Chemistry

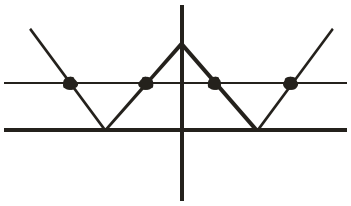
1. $x^2(y-1) + x(y-1) + (y-2) = 0$
For real x, $D \geq 0$

2. $2^y = 2 - 2^x > 0$

3. $h(x) = f[g(x)] = x$

4. $-\sqrt{a^2+b^2} + c \leq a \sin x + b \cos x + c \leq + \sqrt{a^2+b^2} + c$

5. LCM of $(2\pi, \pi) = 2\pi$

6. 

7. $e^{x \to 0 (\sin x . \cot x)}$

8. $$x \to \infty \frac{\sqrt{1+\frac{1}{x^2}} - x^{-1/3}\left(1-\frac{1}{x^2}\right)^{1/3}}{\sqrt{1+\frac{1}{x^4}} - x^{-1/5}\left(1+\frac{1}{x^4}\right)^{1/5}} = 1$$

9. $ax^2 + bx + c = a(x-\alpha)(x-\beta)$
So required limit
$$x \to \alpha \frac{2a^2\left[\sin\frac{a(x-\alpha)(x-\beta)}{2}\right]^2 (x-\beta)^2}{4\left[\frac{a(x-\alpha)(x-\beta)}{2}\right]^2}$$

10. It is a continuous function.

11. $f(0_+) = f(0)$

12. $$\lim_{x \to \frac{\pi}{4}} \left(\frac{1-\tan x}{4x-\pi}\right)$$

13. $$\lim_{x \to \pi} \left(\frac{1-\sin x+\cos x}{1+\sin x+\cos x}\right)$$

15. $y = \cos^{-1}\left(\frac{2}{\sqrt{13}}\cos x + \frac{3}{\sqrt{13}}\sin x\right)$

$= \cos^{-1}(\cos\alpha\cos x + \sin\alpha\sin x)$

$y = \cos^{-1}\cos(\alpha - x)$ or $\cos^{-1}\cos(x - \alpha)$

$y = \alpha - x$ or $x - \alpha$

$y = \cos^{-1}\frac{2}{\sqrt{13}} - x$ or $x - \cos^{-1}\frac{2}{\sqrt{13}}$

$\frac{dy}{dx} = -1$ or $+1$

21. For Monotonic increasing $\frac{dy}{dx} \geq 0$

22. $f(x) = x^2 + ax + 1$

$f'(x) = 2x + a$

for increasing function $f'(x) > 0$

$2x + a > 0$ .....(i)

$1 \leq x \leq 2$

$2 \leq 2x \leq 4$

$2 + a \leq 2x + a \leq 4 + a$ .....(ii)

By $2x + a \geq a + 2$ .....(iii)

By (i) & (iii)

$a + 2 > 0$

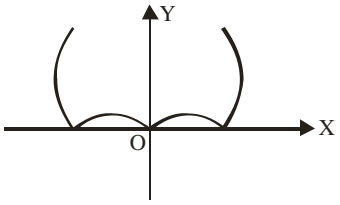
$a > -2$

23. For max. value $\tan A = \tan B \Rightarrow A = B$

25. Min. value of $f(x) = -\frac{D}{4a} = \frac{1}{1+b^2} = m(b)$

So $0 < m(b) \leq 1$

26.



27. For horizontal tangent $\frac{dy}{dx} = 0$

28. $\left|y\frac{dx}{dy}\right|$

31. For differentiable $1 + |x| \neq 0$

Valid for $x \in R$

32. $\lim_{x\to y}\frac{|f(x) - f(y)}{x - y} \leq |x - y|$

$|f'(x)| \le 0$

$f'(x) = 0$

So $f(x) =$ constant k

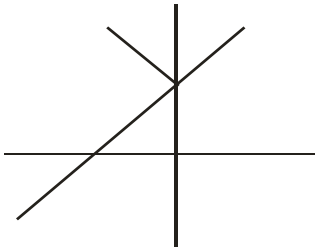
$f(x) = k$

$f(0) = 0$ (so, $k = 0$)

$\therefore \quad f(x) = 0$

$\therefore \quad f(1) = 0$

34.



35. $f'(1_-) \neq f'(1_+)$

$f'(0_-) = f'(0) = f'(0_+)$

71. By $S_n = ut + \frac{a}{2}(2n-1)$

72. $T = \frac{2(u\sin\theta)}{g} = \frac{2\times 80}{10} = 16\,\text{sec}$

Again $T = \frac{2u\sin\theta}{g} \Rightarrow 16 = \frac{2u\sin 30}{10} \Rightarrow u = 160\,\text{m/s}$

At $t = \frac{T}{2}, v = u\cos 30 = 160\frac{\sqrt{3}}{2} = 80\sqrt{3}\,\text{m/s}$

73. By conservation of energy at top position v = 0

74. $a = \frac{\Delta v}{\Delta t}$

75. By $T = f_{s\max}$ & $T = m_1 g$ where m_1 is mass of hanging part.

76. Displacement = 0 $\Rightarrow$ work = 0

77. $W_{ag} = \Delta k + \Delta U$

$= 0 + \Delta U = U_f - U_i$

81. $x = \frac{t^3}{3} \Rightarrow v = t^2, \text{at } t = 0 \Rightarrow v = 0$

at $t = 2 \Rightarrow v = 4$

89. $v = 8t^3$

at t = 0, v = 0 $\quad \Delta k = \frac{1}{2}m\left(v_f^2 - v_i^2\right)$

at t = 1, v = 8 $\quad = 64\ J$

91. $W_{net} = \Delta K$

$$= \frac{1}{2}m\left([20]^2 - [10]^2\right)$$

$$= +300\,J$$

93. $F = ma$

$$a = \frac{F}{m}$$

$$v^2 = 0 + 2as$$

$$v^2 = 2\frac{F}{m}d$$

$$K.E. = \frac{1}{2}mv^2 = \frac{1}{2}m\left[2\frac{F}{m}d\right]$$

i.e., independent of 'm'.

96. $N + F = Mg$

$$N = Mg - F$$

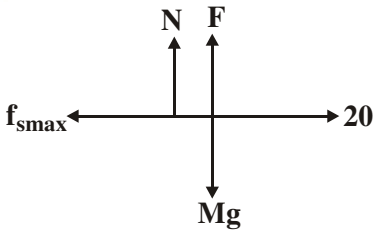
$$N = 50 - F$$

$$20 = \mu N$$

$$20 = \mu[50 - F)$$

$$20 = 0.5[50 - F]$$

F = 10 Newton



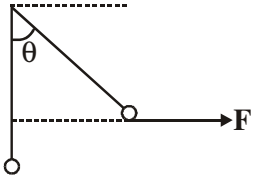
99. $\frac{1}{2}mu^2 = E$

at highest point

$$K.E. = \frac{1}{2}m\left(u\cos 30\right)^2$$

$$= \frac{1}{2}mu^2\frac{3}{4} = E\frac{3}{4}$$

105. $W = \Delta U$



$$FL\cos 45 = Mg\left(L - L\cos 45\right)$$

$$F = mg\left(\sqrt{2} - 1\right)$$