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REVISION – II

Mathematics

STD – XII

I.

1) b) 2

2) a) is always consistent

3) c) 8/7

4) d) $\sin\theta = \frac{\vec{b}\cdot\vec{n}}{|\vec{b}||\vec{n}|}$

5) c) $Re(z) \geq |z|$

6) c) real

7) d) 4/5

8) c) $\left(-a^2m/c, -b^2/c\right)$

9) a) 1

10) b) i, iii only

11) MA

12) b) x axis

13) c) $\pi/2$

14) d) 0

15) b) 1, 2

16) b) $x\ IF = \int IF\, Q\, dy + C$

17) a) 4

18) c) $\sim p \vee q$

19) 3(d)

20) b) 15

II.

21) Any Method

$x + y = 0$ — (2)

22) $\vec{r}\cdot\vec{n} = \vec{a}\cdot\vec{n}$ — (1)

$\vec{r}\cdot(4\vec{i} - 2\vec{j} - 5\vec{k}) = 45$ — (1)

23) $|\sqrt{8-6i}| = |1-3i|$ — (2)

24) $\theta = 2\tan^{-1}(b/a)$ — (1)

$\theta = 2\pi/3$

25) $\frac{dy}{dx} = \frac{12-8x}{5x^{2/5}}$ — (1)

CNS : 0, 3/2 — (1)

26) $I = \int_{-1}^{1} \log\left(\frac{3-x}{3+x}\right) dx$

$f(x)$ is an odd — (1)

$I = 0$ — (1)

27) $y' = 2ax + b$

$y'' = 2a$ — (1)

$y = xy' - \frac{x^2}{2}y'' + c$ — (1)

28)

p	T	T	F	F	
q	T	F	T	F	
$\sim p$	F	F	T	T	— (1)
$(\sim p \wedge q)$	F	F	T	F	
$\sim(\sim p \wedge q)$	T	T	F	T	— (1)

29) $5C_3 p^3 q^2 = 2 \times 5C_2 p^2 q^3$ — (1)

$p = 2/3$ — (1)

30) $\rho(A) = 3$ — (2)

III. 1

31) ANY METHOD

$\vec{A} = \begin{pmatrix} -1 & 2 \\ 1 & -1 \end{pmatrix}$ — (3)

32) $C(4,-3,5)$

$r = 10$ — (3)

33) $z_1 = r_1 e^{i\theta_1}$

$z_2 = r_2 e^{i\theta_2}$ — (1)

$\Rightarrow |z_1 z_2| = r_1 r_2$ — (1)

$= |z_1||z_2|$ — (1)

34) Diagram — (1)

$y^2 = 3600x$ — (1)

Depth $16/9$ cm — (1)

35) $f(x) = \tan^{-1}x$ $\quad f(0) = 0$

$f'(x) = 1 - x^2 + x^4 + \ldots$ $\quad f'(0) = 1$

$f''(x) = -2 - \ldots$ $\quad f''(0) = -2$

— (1)

$f(x) = f(0) + f'(0)\frac{x}{1!} + \ldots$ — (1)

$\tan^{-1}x = x - x^3/3 + \ldots$ — (1)

36)

$\frac{\partial z}{\partial t} = \frac{dz}{dy}\cdot\frac{\partial y}{\partial t} + \frac{dz}{dx}\cdot\frac{\partial x}{\partial t}$ — (1)

$= e^{x^2}(-1) + 2xy\,e^{x^2}(2)$ — (1)

$= e^{4t^2}(8t - 8t^2 - 1)$ — (1)

37) Diagram — (1)

$A = \int_3^5 x\,dy = 3$ — (2)

38) $IF = \sin x$ — (1)

$ye^{\int P dx} = \int Q e^{\int P dx} dx + c$ — (1)

$y\sin x = -\frac{\cos 2x}{2} + c$ — (1)

39) $E(x) = 1/3$ — (1)

$E(x^2) = 2/9$ — (1)

$Var(x) = 1/9$ — (1)

40) $Z_6 = \{[0],[1],[2],[3],[4],[5]\}$ — (1)

Orders $1, 6, 3, 2, 3, 6$ — (2)

IV

41) $(A,B) = \begin{pmatrix} k & 1 & 1 & 1 \\ 1 & k & 1 & 1 \\ 1 & 1 & k & 1 \end{pmatrix}$

$\sim \begin{bmatrix} 1 & 1 & k & 1 \\ 0 & 0 & 1-k & 0 \\ 0 & 0 & (1-k) & 1-k \end{bmatrix}$ — (2)

$(k+2)$

i) Unique $k \neq 1, k \neq -2$ — (1)

ii) More $k = 1$ — (1)

iii) No $k = -2$ — (1)

$\frac{\partial w}{\partial x} = \frac{\partial w}{\partial u}\frac{\partial u}{\partial x} + \frac{\partial w}{\partial y}\cdot\frac{\partial y}{\partial y}$ — (1)

$= \frac{x}{y^2}\cdot x^y(2+y)$ — (1½)

$\frac{\partial w}{\partial y} = \frac{\partial w}{\partial u}\cdot\frac{\partial u}{\partial x} + \frac{\partial w}{\partial y}\cdot\frac{\partial v}{\partial y}$ — (1)

$= \frac{x^2}{y^3}\cdot xy(-2 + y\log x)$ — (1½)

42) $\vec{r} = \vec{a} + s\vec{u} + t\vec{v}$ — (2)

$\vec{r} = (-\vec{i} - 2\vec{j} + \vec{k}) + s(\vec{i} + 2\vec{j} + 4\vec{k}) + t(2\vec{i} - \vec{j} + 3\vec{k})$

CF $\begin{vmatrix} x-x_1 & y-y_1 & z-z_1 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$ — (1)

$2x + y - z + 5 = 0$ — (2)

Diagram — (1)

$\vec{a}.\vec{b} - \vec{c}.\vec{c} = 0$ — (1)

$\vec{b}.\vec{c} - \vec{b}.\vec{a} = 0$ — (1)

$\Rightarrow \vec{c}.(\vec{b}-\vec{a}) = 0$ — (1)

Proof — (1)

43) $z = x+iy$

$\frac{z+1}{z-i} = \frac{(x+1)+iy}{x+i(y-1)}$ — (2)

$Re\left(\frac{z+1}{z-i}\right) = 0$

$\frac{x(x+1)+y(y-1)}{x^2+(y-1)^2} = 0$ — (2)

$x^2+y^2+x-y = 0$ — (1)

Closure Axiom — (1/2)

Associative

$a*(b*c) = a+b+c+2$

$= (a*b)*c$ — (1)

Identity $e = -1 \in Z$ — (1)

Inverse $\bar{a}^1 = -2-a \in Z$ — (1)

Commutative — (1/2)

$(Z,*)$ is an infinite Abelian Group — (1)

44) Diagram — (1)

$\frac{x^2}{100} + \frac{y^2}{36} = 1$ — (2)

$y_1 = 4.8$ — (1)

Total ht = 16.8ft — (1)

$(y+3)^2 = 8x$

$y^2 = 8x$ — (1)

Ax: $y+3=0$; V(0,-3) — (1)

F(2,-3); Dr $x=-2$ — (1)

LR $x=2$; Leng = 8 — (1)

Diagram — (1)

45) $\frac{dy}{dx} = -\frac{\sin^2\theta}{\cos^2\theta}$ — (2)

Eqn of tgt,

$y - a\sin^4\theta = -\frac{\sin^2\theta}{\cos^2\theta}(x - a\cos^4\theta)$ — (1)

$\frac{x}{a\cos^2\theta} + \frac{y}{a\sin^2\theta} = 1$ — (1)

Sum of Intercepts $= a$ — (1)

Diagram — (1)

$A = (x+8)(y+12)$

$= 12x + 8\left(\frac{384}{x}\right) + 486$ — (1)

$A^1 = 12 - 8 \times 384 \times 1/x^2$ — (1)

Let $A^1 = 0 \Rightarrow x = \pm 16$ — (1)

Dimension (24cm x 36cm) — (1)

46) $\frac{dx}{dy} + x = e^{-y}\sec^2 y$ — (1)

Sol

$xe^y = \int e^{-y}\sec^2 y\, e^y\, dy$ — (2)

$xe^y = \tan y + c$ — (2)

$A = A_0 e^{kt}$ — (2)

$e^{50k} = 0.95$ — (2)

$A = 0.9025 A_0$ — (1)

47) pdf — (1)

$f(x) = ce^{9/4} e^{-1/2\left(\frac{x-3/2}{1/\sqrt{2}}\right)^2}$ — (2)

$\mu = 3/2$, $\sigma^2 = 1/2$; $c = e^{-9/4}/\sqrt{\pi}$ — (1+1)

Diagram — (1)

$y = 3x/4$ — (1)

$V = \frac{9\pi}{16} \int_0^4 x^2 dx$ — (2)

$= 12\pi$ cu.u — (1)