VAIGAI MATRIC HR. SEC. SCHOOL,

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11th ANSWER KEY - 2024.

(1) d) N'
(2) c) n
(3) b) 2
(4) b) $\frac{1}{2\sqrt{2}}$
(5) b) $1, \sqrt{2}$
(6) a) $r!$
(7) b) 2^{10}
(8) d) $n(n+1)$
(9) b) $-\frac{4}{3}$ Question changed Doubt
(10) b) $x+y-2=0$
(11) a) $k=3$
(12) b) 8
(13) c) 0
(14) d) 0
(15) b) 9
(16) d) $\frac{1}{2}$
(17) b) 12
(18) b) $\frac{1}{2}+\frac{\pi}{4}$
(19) c) abc
(20) b) 1

(21) $n = 2$ — (1)
$e(e(e(e\phi)) = 2^2 = 4$ — (1)

(22) $(256)^{-\frac{1}{2}\times\frac{-1}{4}\times 3}$ — (1)
$(2^8)^{\frac{1}{8}\times 3}$
$= 8$ — (1)

(23) $\theta = -\frac{\pi}{6}$ — (1)
$\theta = n\pi + (\alpha)$ — (1)
$\theta = n\pi + (-\frac{\pi}{6})\ n\in Z$

(24) Total way
$= {}^{10}C_1 \times {}^{9}C_1 \times {}^{8}C_4$ — (1)
$= 6300$ — (1)

(25) $\delta = \frac{|c_1 - c_2|}{\sqrt{a^2+b^2}}$ — (1)
$= \frac{14}{13}$ — (1)

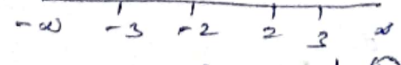
(26) $|A| = 0$ — (1)
$a = \frac{-6}{7}$ — (1)

(27) Unit Vector $\frac{\vec{a}}{|\vec{a}|}$ — (1)
$= \frac{5\hat{i} - 3\hat{j} + 4\hat{k}}{\sqrt{50}}$ — (1)

(28) $n\,(3)^{n-1} = 27$ — (1)
$n = 3$ — (1)

(29) $\frac{dx}{dt} = a(1-\cos t)$
$\frac{dy}{dt} = a\sin t$ } — (1)
$\frac{dy}{dx} = \frac{a\sin t}{1-\cos t}$ } — (1)

(30) ${}^{4}C_2\, x^2 y^2$ — (1)
$= 6x^2y^2$ — (1)

(31)


— (1)

Interval	f(x)
$(-\infty, -3)$	no real
$(-3, -2)$	no real
$(-2, 2)$	no real
$(2, 3)$	no real
$(3, \infty)$	no real

— (1)
Domain of f(x) is ϕ.

(32) $x^2 - 6x + 65 = (x-5)^2 + (x-x)^2$ — (1)
$x = -10$ — (2)

(33) L.H.S
$= \cos\frac{3\pi}{4}\cos x - \sin\frac{3\pi}{4}\sin x$
$-\cos\frac{3\pi}{4}\cos x - \sin\frac{3\pi}{4}\sin x$ — (1)
$= -2\sin\frac{3\pi}{4}\sin x$ — (1)
$= -\sqrt{2}\sin x$ — (1)

(34) $\frac{{}^{n}P_r}{n\,C\,r} = r!$ — (1)
$r = 4$ — (1)
$n = 12$ — (1)

(35) $a_1 = 1$ $a_2 = 2$ $a_3 = 3$
$a_4 = 6$ $a_5 = 11$ $a_6 = 20$ — (2)
The first 6 terms are
1, 2, 3, 6, 11, 20, ...

(36) $m_1 = \sqrt{3}$, $m_2 = -\sqrt{3}$, $b = 7$ — (1)
$y = m_1x + b$, $y = m_2x + b$ — (1)
$y = \sqrt{3}x + 7$, $y = -\sqrt{3}x + 7$ — (1)

(37)

$$= \begin{vmatrix} bc & bc & b^2c^2 \\ ca & ca & c^2a^2 \\ ab & ab & a^2b^2 \end{vmatrix} + \begin{vmatrix} c & bc & b^2c^2 \\ a & ca & b^2c^2 \\ b & ab & a^2b^2 \end{vmatrix} \quad -(1)$$

$$= \frac{abc}{abc} \begin{vmatrix} ab+ca & abc & ab^2c^2 \\ bc+ab & abc & bc^2a^2 \\ ca+bc & abc & ca^2b^2 \end{vmatrix} \quad -(1)$$

$$= \frac{abc}{abc} \begin{vmatrix} ab+ca & 1 & bc \\ bc+ab & 1 & ca \\ ca+bc & 1 & ab \end{vmatrix} \quad -(1)$$

$$= 0 \quad -(1)$$

(38) $|\vec{a}| = 7$, $|\vec{b}| = 7$, $\vec{a}\cdot\vec{b} = -9$ $\}$ -(1)

$$\theta = \cos^{-1}\left(\frac{\vec{a}\cdot\vec{b}}{|\vec{a}||\vec{b}|}\right) \quad -(1)$$

$$\theta = \cos^{-1}\left(\frac{-9}{49}\right) \quad -(1)$$

(39) $$\lim_{n\to\infty} \frac{\frac{n(n+1)}{2}}{3n^2+7n+2} \quad -(1)$$

$$\lim_{n\to\infty} \frac{n^2}{2n^2}\left(\frac{1+\frac{1}{n}}{3+\frac{7}{n^2}+\frac{2}{n^2}}\right) \quad -(1)$$

$$= \frac{1}{6}$$

(40) $$y' = \frac{x^2(-\sin 3x)\cdot 3 - (\cos 3x)(2x)}{(x^2)^2} \quad -(2)$$

$$y' = -\frac{[3x\sin 3x + 2\cos 3x]}{x^3} \quad -(1)$$

(41) a) $R = \{(3,8),(6,6),(9,4),(12,2)\}$ -(1)

(i) Reflexive :- $a\,R\,a$ $3,3 \notin R$
not Reflexive -(1)

(ii) Symmetric :- $(8,3) \notin R$
not Reflexive -(1)

(iii) Transitive :- $a\,R\,b$, $b\,R\,c$ $\Rightarrow$ $a\,R\,c$
Transitive -(1)

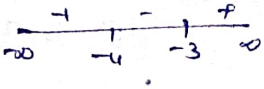
(iv) Equivalence :-
not equivalence -(1)

b) $a = AR^{p-1}$, $b = AR^{q-1}$, $c = AR^{r-1}$ $\}$ -(1)

$$= \log(AR)^0 \quad -(1)$$

$$= \log(1) \} \text{-(2)}$$
$$= 0$$

(42) a) $\frac{x+4}{x+3} > 0$ -(2)



-(3)

Solution $(-\infty,-4) \cup (-3,\infty)$

b) $A+B+C = 180^\circ$ -(1)

$$\frac{A}{2} + \frac{B}{2} = 90^\circ - \frac{C}{2} \quad -(1)$$

$$\tan\left(\frac{A}{2}+\frac{B}{2}\right) = \tan\left(90^\circ - \frac{C}{2}\right) \quad -(1)$$

$$\tan\frac{A}{2}\tan\frac{B}{2} + \tan\frac{B}{2}\tan\frac{C}{2} + \tan\frac{C}{2}\tan\frac{A}{2} = 1 \quad -(1)$$

(43) a) Step $n=1$ -(1)
Step $n=k$ -(2)
Step $n=k+1$ -(2) } PT

b) $a=0$ $|A|=0$ is a factor
$b=0$ " "
$c=0$ " " } -(1)

abc is a factor
degree factor $=3$
diagonal degree $=3$
$m = 3-3 = 0$ -(1)

$$\begin{vmatrix} b+c & a-c & a-b \\ b-c & c+a & b-a \\ c-b & c-a & a+b \end{vmatrix} = k(abc) \quad -(2)$$

$k = 8$

P.T -(1)

(44) a)
$a=9$ $h=-12$, $g=-6$
$f=8$ $c=-12$ -(1)

$abc + 2fgh - af^2 - bg^2 - ch^2 = 0$ -(2)

$\tan\theta = 0^\circ$ parallel

$$D = 2\sqrt{\frac{g^2-ac}{a(a+b)}} = \frac{8}{5} \quad -(2)$$

b) $|\vec{a}\ \vec{b}\ \vec{c}| = 0$ -(5)

(45) a)

$$\lim_{y\to 0} \frac{3^y-1}{y} + \frac{2\sin^2\frac{y}{2}}{y} - \frac{e^y-1}{y} \quad -(2)$$

$$= \log(3) - 1 + (1)^2(0) \quad -(1)$$

$$= \log(3) - 1 \quad -(2)$$

b) P.T -(5)

(46) a) $y' = 2\cos^{-1}\left(\frac{-1}{\sqrt{1-x^2}}\right)$ -(1)

$\sqrt{1-x^2}\,y' = -2\cos^{-1}x$

$(1-x^2)y'' - xy' - 2 = 0$ -(2)

at $x=0$, $y_2 = 2$ -(2)

b) $a=-1$, $b=\sqrt{3}$, $c=\sqrt{2}$ -(1)

$r = 2$ -(1)

$\sin\theta\cos\frac{\pi}{6} - \cos\theta\sin\frac{\pi}{6} = \sin\frac{\pi}{4}$ -(2)

$\theta = n\pi \pm \frac{\pi}{6} \pm (-1)^n\frac{\pi}{4}$, $n\in\mathbb{Z}$ -(1)

(47) a) (i) $^4C_2 \times {}^7C_2 = 126$ ways -(1)

(ii)

men	2	3	4
women	3	2	1

$^4C_2\times{}^7C_2 + {}^4C_3\times{}^7C_2 + {}^4C_4\times{}^7C_1$

$= 301$ way -(2)

c)

men	0	1	2
women	5	4	3

-(2)

$^4C_0\times{}^7C_5 + {}^4C_1\times{}^7C_4 + {}^4C_2\times{}^7C_3$

$= 371$ ways

b) (i) $y' = e^{-2x}[\cos x - 2\sin x]$ -(2)

(ii) $\log y = x^2\log(x)$ -(3)

$y' = x^{x^2}(x + 2x\log x)$

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