Sethu Bhaskara MHSS
QUARTERLY EXAMS '18
XI STD
Mathematics

SECTION - I

1) d) $(-\infty, 1)$
2) MA
3) d) f is neither 1-1 nor onto
4) c) x
5) a) $-1/2$
6) b) $[2, \infty)$
7) a) 2
8) b) $(-\infty, -3] \cup [7, \infty)$
9) a) 0
10) c) $-a/b$
11) c) $4A/117$
12) b) $2x, 1/x$
13) b) 3^4
14) b) $(1/2)^n \times 2nC_n \times nP_n$
15) a) 2520
16) a) $9!/(2!)^3$
17) b) $\cos 2(\theta+\phi)$
18) d) 20
19) d) 309
20) b) $[1, \sqrt{2}]$

SECTION - II

21) $n(A\Delta B) = n(A\cup B) - n(A\cap B) = 7$ — (1)

$n[P(A\Delta B)] = 2^7$ — (1)

22) Proof — (2)

23) $f(x) = \frac{-(x-5)}{x-5} = -1$

Domain $\to$ R — (1)

Range $\to -1$ — (1)

24) $6-4x-x^2 = x^2+8x+16$

$\Rightarrow x = -1$ — (2)

25) $\cos 105 = \cos(60+45)$

$= \frac{1-\sqrt{3}}{2\sqrt{2}}$ — (2)

26) $x = n\pi + 5\pi/6, n \in z$ — (2)

27) $\sqrt{2}\cos 55°$ — (2)

28) $r = 4$ — (2)

29) $4C_3 \times 48C_2$ — (1)

$= 4512$ — (1)

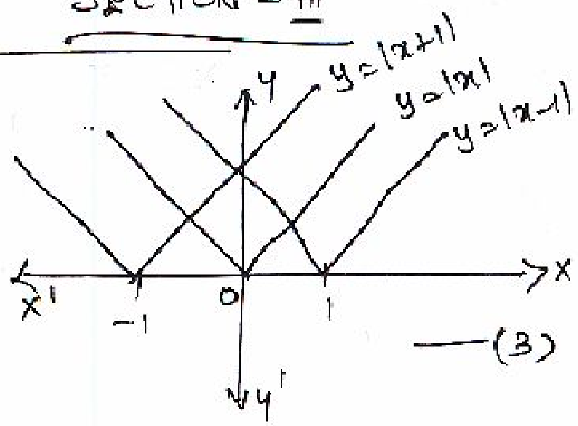
30) Proof

$\cos\left(\frac{3\pi}{4}+x\right) - \cos\left(\frac{3\pi}{4}-x\right) =$

$-\sqrt{2}\sin x$ — (2)

SECTION - III

31)



— (3)

32) Let $f(x) = f(y)$ — (1)

$\Rightarrow x = y$ (or) $xy = -1$ — (1)

f is not 1-1 — (1)

33)

$$\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y} = k \quad \text{— (1)}$$

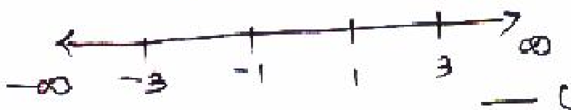
$$\log x + \log y + \log z$$

$$= k(y-z+z-x+x-y) = 0 \quad \text{— (1)}$$

$$xyz = e^0 = 1 \quad \text{— (1)}$$

34) $\frac{x+1}{x+3} \geq 0$ and

$\frac{x-1}{x-3} \geq 0$ — (1)



— (1)

$x \in (-\infty, -3) \cup [-1, 1] \cup (3, \infty)$

— (1)

35) $\tan(A+B) = \tan 45 = 1$ — (1)

$\tan A + \tan B + \tan A \tan B = 1$ — (1)

$\Rightarrow (1+\tan A)(1+\tan B) = 2$ — (1)

36) $a = 4$; $b = 6$; $c = 8$

$a = b\cos C + c\cos B$ — (1)

$4 = 6\cos C + 8\cos B$ — (1)

$\Rightarrow 4\cos B + 3\cos C = 2$ — (1)

37)

Th	H	T	O
7			0 or 5

— (1)

No. of ways $= 1 \times 8 \times 7 \times 2 = 112$

— (2)

38) $\frac{{}^{(n+2)}C_7}{{}^{(n-1)}P_4} = \frac{13}{24}$ — (1)

$(n+2)(n+1)n = 13 \times 14 \times 15$ — (1)

$n = 13$ — (1)

39) No. of ways

$= 5! \times 5 + 4! \times 0 + 3! \times 0 + 2! \times 1 + 1! \times 1 + 0! \times 1$

$= 600 + 2 + 1 + 1 = 604$ — (3)

40) $b\cos C + c\cos B$

$= 2R\sin B\cos C + 2R\sin C\cos B$ — (1)

$= 2R(\sin B\cos C + \cos B\cos C)$

$= 2R\sin A = a$ — (2)

SECTION – IV

41) a) $A = \{-1, 0, 1, 2\}$ — (2)

other elements

$(-1, 0), (-1, 1), (0, 2), (1, 2)$

— (3)

b) $\frac{7+x}{(1+x)(x^2+1)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+1}$

— (1)

$A = 3$ — (1)

$B = -3$ — (1)

$C = 4$ — (1)

$\frac{7+x}{(x+1)(x^2+1)} = \frac{3}{x+1} + \frac{(-3x+4)}{x^2+1}$ — (1)

42) $y = 3x - 5$

a) Inverse, $f^{-1}(x) = \frac{x+5}{3}$ — (2)

$f^{-1} \circ f = f \circ f^{-1} = x$ — (3)

other

$f(x) = f(y)$

$\Rightarrow x = y$

b)

$R = \{(0, \pm 5), (\pm 5, 0)$
$(\pm 3, 4), (3, \pm 4)$
$(\pm 4, \pm 3)\}$ —— (2)

Domain $= \{0, \pm 3, \pm 4, \pm 5\}$ —— (2)

$R^{-1} \Rightarrow x^2 + y^2 = 25$ —— (1)

43) a) other roots are
$x = 2, 3$ —— (5)
(Any method)

b) Diagram — (1)

Area of the segment
$= \frac{1}{2} r^2 \theta - \frac{1}{2} r^2 \sin\theta$ —— (1)

$\cos\theta = \frac{1}{2} \Rightarrow \theta = \pi/3$ —— (1)

$\therefore$ Area
$= \frac{4}{3}(2\pi - 3\sqrt{3})\, m^2$ —— (2)

44) a) $a \sin(A/2 + B)$ —— (1)

$= 2R \sin A \sin(A/2 + B)$ —— (1)

$= 2R \sin A/2 \, [\sin C + \sin B]$ —— (2)

$= \sin A/2 \, (b + c)$ —— (1)

b)
$\cos^2 x + \left(\frac{\cos x}{2} - \frac{\sqrt{3}\sin x}{2}\right)^2 +$
$\left(\frac{\cos x}{2} + \frac{\sqrt{3}\sin x}{2}\right)^2$ —— (2)

$= \cos^2 x + \frac{1}{4}(2\cos^2 x + 6\sin^2 x)$ —— (1)

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

$= 3/2$ —— (1)

45)
a) $\sin^2 \pi/18 + \sin^2 \frac{2\pi}{18} + \sin^2 \frac{7\pi}{18}$
$+ \sin^2 \frac{8\pi}{18}$ —— (1)

$= \sin^2 \frac{\pi}{18} + \sin^2 \frac{2\pi}{18} + \sin^2\left(\frac{\pi}{2} - \frac{2\pi}{18}\right)$
$+ \sin^2\left(\frac{\pi}{2} - \frac{\pi}{18}\right)$ —— (2)

$= \sin^2 \frac{\pi}{18} + \sin^2 \frac{2\pi}{18} + \cos^2 \frac{2\pi}{18} +$
$\cos^2 \frac{\pi}{18}$ —— (1)

$= 1 + 1 = 2$ —— (1)

b)
Let $P(n)$ = Given —— (1)

$P(1) \Rightarrow$ LHS = RHS $= \frac{1}{10}$
$P(1)$ is true

Let $P(k)$ also true —— (1)

$P(k) \Rightarrow \frac{1}{2 \cdot 5} + \cdots + \frac{1}{(3k-1)(3k+2)} = \frac{k}{6k+4}$
—— (1)

$P(k+1) = \frac{k+1}{6(k+1)+4}$ —— (1)

By Mathematical Induction
$P(n)$ is true —— (1)

46) a) Sum of digits = 21 —— (1)

Sum of 1 digit $= 24 \times 21 \times 1 = 504$
Sum of 2 " $= 24 \times 21 \times 10 = 5040$
Sum of 3 " $= 24 \times 21 \times 100 = 50400$
Sum of 4 " $= 24 \times 21 \times 1000 = 504000$

559944

b)

$P(n) = a^n - b^n$ is divisible by $a-b$ — (1)

$P(1) = a-b$ is divisible by $a-b$ — (1)

$\Rightarrow P(1)$ is true

Assume $P(k)$ is also true — (1)

$P(k+1)$ is also true

$P(k) = a^k - b^k = \lambda(a-b)$

$\Rightarrow P(k+1) = a\lambda + b^k$, true — (1)

By Mathematical Induction $P(n)$ is true — (1)

47) a) $\frac{(2n)!}{n!} = \frac{2n(2n-1)(2n-2)\cdots 3\cdot 2\cdot 1}{n!}$ — (1)

$= \frac{2^n (n!)(1\cdot 3\cdot 5\cdots(2n-1))}{n!}$ — (2)

$= 2^n (1\cdot 3\cdot 5\cdots(2n-1))$ — (2)

b) No. of ways

$= (4C_3 \times 2C_1 \times 10C_7) +$
$(4C_1 \times 2C_2 \times 10C_6) +$
$(4C_4 \times 2C_1 \times 10C_6) +$
$(4C_4 \times 2C_2 \times 10C_5)$ — (3)

$= 960 + 840 + 420 + 252$ — (1)

$= 2472$ — (1)

SNo	Teachers' Name	Sign
01	Mrs. Lavanya Bala. K	[signature]
02	Mrs Gopi. S	[signature] 14/9/18
03	Mr. Prabhaharan. R	[signature]
04	Mr. Mathan. T	[signature]
05	Mr. Haris. M	[signature]
06	Mr. Purushothaman. B	[signature] 14/9/18
07	Mr. Venkatesan. T	T. Ven
08	Mrs. Sundari. K	[signature]

+ copies of xerox KD 14/9/18