

சிறப்பாணையில் பொதுத் தேர்வு 2017-18

12-ம் வகுப்பு

புதிதான அணிகல்கணிதம் - KEY

15-12-2017

1.	b	$ A $	21.	b	$e^{3x} + K$
2.	b	$\begin{pmatrix} 0.8 & -0.6 \\ 0.6 & 0.8 \end{pmatrix}$	22.	b	3 மூலங்களும்
3.	a	1	23.	a	$C - \frac{K}{e^x} = P$
4.	b	0.2	24.	c	$\frac{dv}{\sqrt{v^2+1}} = \frac{dx}{x}$
5.	c	I	25.	a	$\frac{e^{5x}}{b}$
6.	a	x - அச்சத்திலே	26.	c	$2x+1$
7.	b	$\frac{8}{3}$	27.	c	3
8.	c	$\frac{a^2}{2}$	28.	b	0.3
9.	c	மூலங்கள்	29.	b	$\mu \pm \sigma$
10.	a	$P = 30x - 900$	30.	b	2
11.	c	₹4	31.	c	$E(XY) = E(X)E(Y)$
12.	c	$(\frac{1}{4}, \frac{1}{2})$	32.	b	கிடைக்காத பின்னம்
13.	a	0.5 மீ/நொடி	33.	c	1.96
14.	a	$\frac{7}{2}$	34.	b	$ z \geq 2.58$
15.	d	3	35.	c	45
16.	d	3	36.	d	மேற்கண்டவை சிலவற்றும்.
17.	a	8	37.	b	நினைவுப் போக்கு.
18.	a	1000	38.	b.	குறிப்பிட்ட காரண விளைவுகள்
19.	b	$\frac{64}{5}$	39.	c	-1 இல் இருந்து 1 வரை
20.	b	$\int_c^d x dy$	40.	c	$Y = T + S + C + J$

52. (i) $p(x \leq 1) = \frac{2}{3}$
 (ii) $p(x \leq 2) = \frac{29}{30}$
 (iii) $p(0 < x < 2) = p(x=1) = \frac{1}{2}$

$|I-B| = \frac{20}{91}$
 $(I-B)^{-1} = \frac{1}{20} \begin{pmatrix} 49 & 14 \\ 52 & 52 \end{pmatrix}$
 $X = (I-B)^{-1} D = \frac{42}{78}$

53. Sample size = 50
 Sample mean = 75
 Sample S.D = 10
 $N = 200$
 95% $\Rightarrow \bar{x} \pm z_c \frac{s}{\sqrt{n}} \sqrt{\frac{N-n}{N+1}}$
 $= 75 \pm 1.96 \left(\frac{10}{\sqrt{50}} \right) \sqrt{\frac{200-50}{200+1}}$
 $= 75 \pm 2.4$
 $= 72.6 \text{ and } 77.4$

58. $y = \frac{1}{10} x^2 - 3x + 50$
 $10y = (x-15)^2 + 275$
 $(x-15)^2 = 10(y-27.5)$
 $x^2 = 10y$
 $x = x-15, y = y-27.5$
 $\Rightarrow a = 2.5$
 2.5% ରେ 15 ଶ.ଶ., 8.1% ରେ 27.50

54. $\sum x = 70, \sum y = 63$
 $\sum x^2 = 28, \sum y^2 = 84, \sum xy = 46$
 $\bar{x} = \frac{\sum x}{n} = \frac{70}{7} = 10$
 $\bar{y} = \frac{\sum y}{n} = \frac{63}{7} = 9$
 $r(x,y) = \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}} = \frac{46}{\sqrt{28} \sqrt{84}} = 0.9485$

59. $C = 100 + 2x + 2x^2$
 $AC = \frac{100 + 2x + 2x^2}{x} = \frac{100}{x} + 1 + 2x$
 $AC \text{ ର ନିମ୍ନତମ ମୂଲ୍ୟ} = \frac{d}{dx}(AC) = -\frac{100}{x^2} + 2 = 0$
 $MC = \frac{d}{dx}(C) = 1 + 4x$
 $MC - AC = -\frac{100}{x} + 2x$
 $\frac{1}{x}(MC - AC) = -\frac{100}{x^2} + 2 = 0$
 ① & ② $AC \text{ ର ନିମ୍ନତମ ମୂଲ୍ୟ} = \frac{1}{x}(MC - AC)$

56. $90x + 100y + 20z = 800$
 $130x + 50y + 40z = 900$
 $60x + 100y + 30z = 850$
 $\div 10 \Rightarrow 9x + 10y + 2z = 80$
 $13x + 5y + 4z = 90$
 $6x + 10y + 3z = 85$
 $\Delta = -175 \neq 0, \Delta x = -350$
 $\Delta y = -700, \Delta z = -1925$
 $x = \frac{\Delta x}{\Delta} = 2, y = 4, z = 11$

60. $R = 9,000, C_1 = 15\% = \frac{15}{100} \times 20 = 3$
 $C_3 = Rs. 15$
 $EOQ = \sqrt{\frac{2 \times 15 \times 9000}{3}} = 300$
 $\frac{Q_0}{R} = \frac{1}{30}$
 $= \frac{365}{30} = 12$
 $\text{ମାଗଣା} = \sqrt{2C_1 C_3 R} = 9,000$

57. $B = \begin{pmatrix} 3/4 & 2/13 \\ 9/4 & 6/13 \end{pmatrix}$
 $I-B = \begin{pmatrix} 1/4 & -2/13 \\ -9/4 & 7/13 \end{pmatrix}$

61. $u = \log(x^2 + y^2 + z^2)$
 $\frac{\partial u}{\partial x} = \frac{2x}{x^2 + y^2 + z^2}$
 $\frac{\partial^2 u}{\partial x^2} = \frac{-4xz}{(x^2 + y^2 + z^2)^2}$
 $\therefore \frac{\partial^2 u}{\partial x^2} = \frac{-4xz}{(x^2 + y^2 + z^2)^2}$

$$\therefore z \frac{\partial^2 z}{\partial x \partial y} = \frac{-4xyz}{(x^2+y^2+z^2)^2} \quad \text{--- 2}$$

$$\therefore x \frac{\partial^2 z}{\partial y \partial z} = \frac{-4xyz}{(x^2+y^2+z^2)^2} \quad \text{--- 2}$$

$$D = \text{---} = \text{---}$$

$$+ \dots + y_4 \frac{(x-x_1)(x_2-x_1)(x-x_3)(x-x_3)}{(x_4-x_1)(x_1-x_2)(x_2-x_3)(x_3-x_3)}$$

$$y = -3.066 + 163.55 + 441.6 - 152.44 + 3.666$$

$$y = 453.311, x = 4$$

62. $y^2 = x^2(16-x^2)$

$$y = \pm x \sqrt{16-x^2}$$

$$A = \int_a^b y dx = 2 \int_0^4 x \sqrt{16-x^2} dx$$

$$A = 2 \int_{16}^0 \sqrt{t} \left(-\frac{dt}{2}\right) \left| -\frac{dt}{2} = x dx \right.$$

$$= \int_0^{16} \sqrt{t} dt = \left[\frac{t^{3/2}}{3/2} \right]_0^{16} = \frac{16\sqrt{16}}{3/2}$$

$$= \frac{16 \times 4 \times 2}{3} = \frac{128}{3} \text{ ft}^2$$

66. $p = \frac{3}{100}, n = 100$

$$\therefore \lambda = np = 3$$

(i) $P(X=0) = \frac{e^{-\lambda} \lambda^0}{0!} = e^{-3} = 0.0498$

(ii) $P(X=1) = \frac{e^{-\lambda} \lambda^1}{1!} = e^{-3}(3) = 0.1494$

63. $16-x^2 = 2x^2+4$

$$x = \pm 2, x_0 = 2$$

$$P_0 = 12, P_0 x_0 = 24$$

$$CS = \int_0^{x_0} (16-x^2) dx - 24$$

$$= \frac{16}{3} \left[16 - \frac{16}{3} \right]$$

$$PS = 24 - \int_0^{x_0} (2x^2+4) dx$$

$$= \frac{32}{3} \left[16 - \frac{16}{3} \right]$$

67. $f(x) = \frac{1}{20} e^{-x/20}$

(i) $P(X \leq 10) = \int_0^{10} \frac{1}{20} e^{-x/20} dx = 1 - e^{-1/2} = 0.6988$

(ii) $P(16 \leq X \leq 24) = \int_{16}^{24} \frac{1}{20} e^{-x/20} dx$

$$= -\left[e^{-24/20} - e^{-16/20} \right] = 0.1481$$

(iii) $P(X \geq 30) = 1 - P(X \leq 30)$

$$= 1 - \int_0^{30} \frac{1}{20} e^{-x/20} dx = 1 + \left(e^{-30/20} - 1 \right) = 0.2231$$

64. $m = 12, m = 1$

$$C.F = A e^{12x} + B e^x$$

$$P1_1 = \frac{e^{-2x}}{42}, P1_2 = \frac{5x e^x}{-11}$$

$$Y = A e^{12x} + B e^x + \frac{e^{-2x}}{42} - \frac{5x e^x}{-11}$$

68. $n = 1600, \bar{x} = 99$

$$\mu = 100, \sigma = 15$$

H_0 = population mean $\mu = 100$

$H_1 = \mu \neq 100$

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{99 - 100}{\frac{15}{\sqrt{1600}}} = -2.67$$

$$|Z| = 2.67, \alpha = 0.05$$

$$|Z| \geq 1.96, |Z| < 1.96$$

H_0 is rejected.

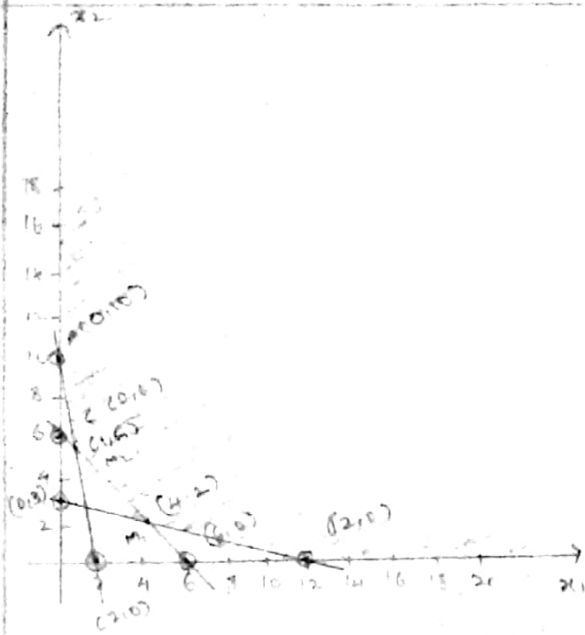
65. $x_0 = 0, x_1 = 3, x_2 = 5, x_3 = 6, x_4 = 8$

$$y_0 = 270, y_1 = 460, y_2 = 414, y_3 = 343, y_4 = 110$$

$$y = y_0 \frac{(x-x_1)(x-x_2)(x-x_3)(x-x_4)}{(x_0-x_1)(x_0-x_2)(x_0-x_3)(x_0-x_4)} + \dots$$

69. A(0,10), B(2,0), C(0,6), D(6,0), E(0,3), F(12,0)

Coordinates	(x1, x2)	Z = 3x1 + 2x2
A	(2, 0)	36
M1	(4, 2)	16
M2	(1, 5)	13
D	(0, 10)	20



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70. Grand Average = $\frac{305.6}{4} = 76.4$ 2

S.I = $\frac{Q.A}{C1.A} \times 100$

S.I for I Quarter = $\frac{75.2}{76.4} \times 100 = 98.4$ 2

S.I for II Quarter = 92.14 2

S.I for III Quarter = 108.9 2

S.I for IV Quarter = 100.52 2

65.

Year	Q1	Q2	Q3	Q4	Grand Avg.
	(1974)	(1975)	(1976)	(1977)	(1978)
1974	12
1975	25	→ 130
1976	39	→ 188	318	...	39.75
1977	54	→ 200	388	...	48.50
1978	70	→ 266	466	...	58.25
1979	37	→ 312	578	...	72.25
1980	105	→ 324	636	...	79.50
1981	100	→ 352	676	...	84.50
1982	82	→ 296	648	...	81.00
1983	65	→ 230	526	...	65.75
1984	49	→ 168	398	...	49.75
1985	34

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