SETHU BHASKARA MATRIC. HR. SEC. SCHOOL, PUDUR

STD: XII — II - REVISION ANSWER KEY — SUB: BUSINESS MATHS

I) SECTION - A — Each 1 marks

1) b) adj A

2) b) $\begin{pmatrix} 0.8 & -0.6 \\ 0.6 & 0.8 \end{pmatrix}$

3) b) an ellipse

4) b) b/a

5) c) $\frac{1}{6}$

6) b) $x - 10y + 105 = 0$

7) b) $\frac{1}{e}$

8) b) 12

9) a) 2

10) a) $P = \frac{k}{x}$ (or) b) $x = \frac{k}{P}$

11) c) $Ae^x + \frac{B}{e^x}$

12) a) $y e^{\int P dx} = \int Q e^{\int P dx} \cdot dx + C$

13) a) $f(x) - f(x-h)$

14) c) $2x + 1$

15) b) 1

16) b) unimodal

17) c) 1.96

18) c) 45°

19) a) In percentages

20) a) $P = \frac{P_1}{P_0} \times 100$, $V = P_0 q_0$

II) SECTION - B

21) $A = \begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ — 1

$|A| = -1$

$adj A = \begin{bmatrix} 4 & -3 \\ -3 & 2 \end{bmatrix}$, $|adj A| = -1$ — 1

22) $a = 12$, $a^2 = 144$

$b^2 = 128$, $C(0,0)$ — 1

The equation of ellipse — 1

$\frac{x^2}{144} + \frac{y^2}{128} = 1$

23) The slope of the tangent line to the curve $y = f(x)$ at (x, y). If θ is the inclination of the tangent line with the +ve direction of x-axis — 2

$m = \tan\theta = \frac{dy}{dx}$ at (x, y)

24) The curve $y = f(x)$ The tangent to

twice differentiable.

(i) $f''(x) > 0$

Concave upward on the interval — 2

(ii) $f''(x) < 0$, concave downward on the interval.

25) $A = \int_0^3 (4x - x^2)\,dx$

$= \left[\frac{4x^2}{2} - \frac{x^3}{3}\right]_0^3$

$= 9$

26) $y = a\cos(mx+b)$

$y' = -ma\sin(mx+b)$

$y'' = -m^2 y$

$y'' + m^2 y = 0$

27) $\Delta^3 y_0 = 0$

$(E-1)^3 y_0 = 0$

$y_1 = 107$

28) $E(x) = 0$

$E(x^2) = 1/3$

29) $n = 1000$, $P = 0.32$

$q = 0.68$, $\sqrt{\frac{pq}{n}} = 0.0147$

$P \pm (z_c)\sqrt{\frac{pq}{n}}$

$= 0.32 \pm 0.028$

$= (0.292, 0.348)$

29.2% and 34.8%

30) $r(x,y) = \frac{N\Sigma xy - \Sigma x \Sigma y}{\sqrt{N\Sigma x^2 - (\Sigma x)^2}\sqrt{N\Sigma y^2 - (\Sigma y)^2}}$

$= \frac{31097 - 46020}{\sqrt{-ve}\ \sqrt{4780}}$

$\sqrt{-ve}$ 69.15

= not possible (as 1.66

SECTION – C

III

31) $AB = \begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix}$

$adj(AB) = \begin{bmatrix} 2 & -1 \\ 0 & -1 \end{bmatrix}$

$(adj\,B)(adj\,A) = \begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix}\begin{bmatrix} 2 & -1 \\ -4 & 3 \end{bmatrix}$

$= \begin{bmatrix} 2 & -1 \\ 0 & -1 \end{bmatrix}$

32) $e = \frac{\sqrt{7}}{4}$, $C(0,0)$

$V(\pm 2, 0)$

$F(\pm\sqrt{7}, 0)$ $\quad LLR = \frac{9}{4}$

$x = \pm \frac{8}{\sqrt{7}}$

33) $C(x) = 5x + 0.065x^2 + 120$

$R(x) = 18x$

$P = R - C$

$P = 13x - 0.065x^2 - 120$

34) $\frac{dy}{dt} = (3x^2 - 10x + 5)\frac{dx}{dt}$

$2\frac{dx}{dt} = \frac{dy}{dt}$

$3x^2 - 10x + 3 = 0$

$x = 1/3,\ 3$

35) $y = x^4 - 4x^3 + 2x + 3$

$y' = 4x^3 - 12x^2 + 2$ — 1

$y'' = 12x^2 - 24x$ — 1

put $y'' = 0$, $x = 0$, $x = 2$ — 1

The point of $(0, 3)$ $(2, -9)$

36) $\frac{y}{x} = v$

$v + x\frac{dv}{dx} = v - v^2$ — 1

$\int \frac{1}{v^2} dv = -\int \frac{dx}{x}$ — 1

$e^{-x/y} = cx$

(or)

$x = ce^{x/y}$ — 1

37)

$y = -0.667 + 6.4 - 24$

$+ 42.667 + 8.533$ — 2

$y = 32.933$ — 1

38) i) The point of inflection $x = \mu \pm \sigma$ — 1

ii) The curve is unimodal — 1

iii) mean, median, mode of the distribution coincide — 1

(Also any three property)

39) $\bar{x} \pm (z_c)\frac{s}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}}$

$= 75 \pm (1.96)(1.414)(0.868)$ — 1

$= 75 \pm 2.406$ — 1

$= 72.6$ and 77.4 — 1

40)

		Total	Average
1980	80	262	87.33
1981	90	265	88.33
1982	92	269	89.67
1983	83	276	92
1984	94	285	95
1985	99	=	=
1986	92		

1 — 1 — 1

SECTION-IV

41) a) $B = \begin{bmatrix} 1/8 & 1/5 \\ 1/4 & 1/20 \end{bmatrix}$ 1

$I - B = \begin{bmatrix} 7/8 & -1/5 \\ -1/4 & 19/20 \end{bmatrix}$ 1

$|I - B| = \frac{25}{32}$

$X = \frac{32}{25} \begin{bmatrix} 19/20 & 1/5 \\ 1/4 & 7/8 \end{bmatrix} \begin{bmatrix} 5000 \\ 4000 \end{bmatrix}$ 2

$X = \begin{bmatrix} 7104 \\ 6080 \end{bmatrix}$ 1

41) b)

$\Delta 2, \quad \Delta \neq 0$ 1

Cramer's rule applicable

$\Delta x = 0, \quad \Delta y = 4, \quad \Delta z = 8$ 3

$(x, y, z) = (0, 2, 4)$ 1

42) a) Separate equation

$4x - y + l = 0, \quad 2x + 3y + m = 0$ 2

$l = 1, \quad m = -1$ 2

The Separate equation

$4x - y + 1 = 0$ and

$2x + 3y - 1 = 0$

Equation of asymptotes

$8x^2 + 10xy - 3y^2 - 2x + 4y - 1 = 0$ 1

42) (b) $\frac{dy}{dx} = \frac{1-x}{y-2}$ 1

(i) $\frac{dy}{dx} = 0$

$x = 1, \quad y = 0, 4$ 2

The point $(1, 0), (1, 4)$

(ii) $\frac{dy}{dx} = \infty$

$y = 2$

$x = 3, -1$ 2

The point $(3, 2), (-1, 2)$

43) a) $P(K, L) = C L^{\alpha} K^{\beta}$

$\alpha + \beta = 1$ 2

$P(tK, tL) = C t^{\alpha+\beta} (L)^{\alpha} (K)^{\beta}$ 1

By Euler's theorem

$K \frac{\partial P}{\partial K} + L \frac{\partial P}{\partial L} = P$ 2

43) (b) diagram

$A = 4 \int_0^a y \, dx$ 1

$= 4 \left[\frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1}\left(\frac{x}{a}\right) \right]_0^a$ 2

$= \pi a^2$ Sq. units 2

44) a) $x = -8, 4$ — 1

$x_0 = 4, \quad P_0 = 2$

$P_0 x_0 = 8$

$C.S = 16 \log 2 - 8$ — 2

$P.S = 8 - 4 = 4$ — 2

44) (b)

$C.F = Ae^{3x} + Be^{2x}$ — 1

$P.I = \frac{e^{-x}}{12} + \frac{3}{20} e^{-2x}$ — 2

$y = C.F + P.I$ — 2

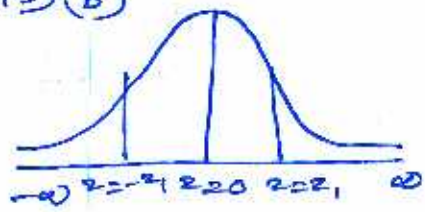
45) a) $\Sigma x = 18, \quad \Sigma y = 15$

$\Sigma x^2 = 110, \quad \Sigma xy = 71$ — 2

$a = 0.38, \quad b = 1.65$ — 2

$y = 0.38x + 1.65$ — 1

45) (b)



$z_1 = 0.84$ — 1

$100 - \mu = -0.840\sigma$ — ① — 1

$200 - \mu = 0.525\sigma$ — 1

$\mu = 161.53, \quad \sigma = 73.26$ — 2

46) a) $n = 400, \quad \bar{x} = 171.38$

$\mu = 171.17$ — 1

$\sigma = 3.3$

Null Hypothesis $H_0: \mu = 171.17$ — 1

Alternative Hypothesis, $H_1: \mu \neq 171.17$

$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = 1.273$ — 1

Critical Region, $|z| \geq 1.96$ — 1

Acceptance Region $|z| < 1.96$ — 1

$\therefore H_0$ accepted — 1

46) (b)

$\frac{dp}{dx} = \frac{2000000}{(500+x)^2} - 1$ — 2

$\frac{d^2p}{dx^2} < 0$

$x = 914 \qquad \frac{d^2p}{dx^2} < 0$ — 1

The profit is maximum at $x = 914$ — 2

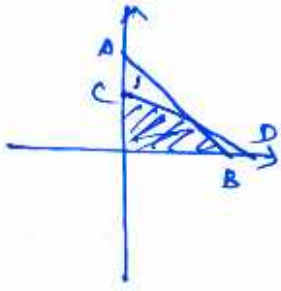
41) a) A (0, 40)

B (20, 0)

C (0, 36)

D (90, 0)

E (2.5, 35)



The maximum Value of $Z = 147.5$ at $x_1 = 2.5$, $x_2 = 35$

2 1 2

41) (b)

$\Sigma P_0 q_0 = 580$, $\Sigma P_1 q_0 = 930$

$\Sigma P_0 q_1 = 800$, $\Sigma R q_1 = 1110$

$P_{01}^{L} = 160.34$

$P_{01}^{P} = 137.50$

$P_{01}^{F} = 148.48$

2 1 1 1

HANDLING TEACHER'S NAME and Signature

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