B.B.A. 1st Semester (Honours) Examination, 2019-20 (CBCS)

BACHELOR OF BUSINESS ADMINISTRATION

Course ID : 13412 **Course Code : CC-02**

Course Title: Business Mathematics

Time: 3 Hours **Full Marks: 80**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group A

1. Answer *all* the questions. 1×10=10

(i) If $f(x) = x + |x - 5|$, find $f(-2)$.

(a) 0 (b) 5
(c) 7 (d) 2
(e) None of these

(ii) The value of ${}^{12}P_4$ is

(a) 1188 (b) 1880
(c) 11880 (d) 12880
(e) None of these

(iii) The sum of the G. P. series of
1+ 2 + 4 + 8 + ... + 64 is

(a) 63 (b) 255
(c) 127 (d) 227
(e) None of these

(iv) The value of $\begin{vmatrix} 15 & -3 & 21 \\ 5 & -1 & 7 \\ 2 & -3 & 8 \end{vmatrix}$ is

(a) 273 (b) 0
(c) – 273 (d) 275
(e) None of these

(v) The value of $\log_2[\log_2\{\log_3(\log_5 125^3)\}]$ is

(a) 0 (b) 1
(c) –1 (d) 2
(e) None of these

(vi) The value of $\lim_{y \to -3} \frac{y^3 - 5y + 3}{y^2 + 1}$ is

(a) 0 (b) $\frac{9}{10}$

(c) $-\frac{10}{9}$ (d) $-\frac{9}{10}$

(e) None of these

(vii) Find $\frac{d}{dx}\left(x^{\frac{2}{3}}\right)$.

(a) $\frac{1}{3}x^{-\frac{2}{3}}$ (b) $\frac{1}{3}x^{\frac{1}{3}}$

(c) $\frac{2}{3}x^{\frac{2}{3}}$ (d) $\frac{2}{3}x^{-\frac{1}{3}}$

(e) None of these

(viii) Find $\int_0^1 \frac{1+x^3}{1+x}\, dx$.

(a) 1 (b) 0

(c) $\frac{11}{6}$ (d) $\frac{6}{11}$

(e) None of these

(ix) The distance between the points (–2, 4) and (4, –5) is

(a) 0 units (b) $\sqrt{116}$ units

(c) $\sqrt{117}$ units (d) 117 units

(e) None of these

(x) The equation $y^2 + 4x + 6y + 9 = 0$ is

(a) Circle (b) Parabola

(c) Hyperbola (d) Ellipse

(e) None of these

Group B

2. Answer *any ten* questions: 2×10=20

(a) If ${}^{25}C_P = {}^{25}C_{P+2}$, find ${}^{P}C_5$.

(b) $A = \begin{bmatrix} -1 & 5 \\ 5 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 11 & -6 \\ -2 & 4 \end{bmatrix}$ then find 3A + 5B.

(c) Solve: $2^{2x+1} + 2^9 = 2^{10}$

(d) $(5^5 + 0 \cdot 01)^2 + (5^5 - 0 \cdot 01)^2 = 5^x$, then $x = ?$

(e) Simplify: $\sqrt[3]{x^4\sqrt{x^{-5}\sqrt{x^6}}}$

(f) Find $\lim_{x\to 2}\frac{\sqrt{1+2x}-\sqrt{1+x^2}}{2-x}$.

(g) Find $\frac{dy}{dx}$ if $y=(\sqrt{x}+3)(x^2+6)$.

(h) Verify that the points (3, –4), (1, 2) and (2, –1) are collinear or not.

(i) Find the logarithm of 0·000001 to the base 0·01.

(j) Find $\int_0^{\pi/2}(3\theta^2+2)^3\,d\theta$.

(k) Define 'Null matrix and 'Diagonal matrix'.

(l) If $x^a=y^b=z^c$, and $xyz=1$, find the value of $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}$.

(m) Find the slope of the line $5x-3y+7=0$.

(n) If $\frac{\log P}{Q-R}=\frac{\log Q}{R-P}=\frac{\log R}{P-Q}$, then show that $P^PQ^QR^R=1$.

(o) If α and β be the roots of $x^2-(1+k^2)x+\frac{1}{2}(1+k^2+k^4)=0$, then show that $\alpha^2+\beta^2=k^2$.

Group C

3. Answer *any four* questions: 5×4=20

(a) Show that

$$\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ b+c & c+a & a+b \end{vmatrix}=(a-b)(b-c)(c-a)(a+b+c)\,.$$

(b) Solve the system of the equation by Matrix method:

$$x+2y+z=7$$
$$x+3z=11$$
$$2x-3y=1$$

(c) Show that

$$(yz)^{log\frac{y}{x}}\times (zx)^{log\frac{z}{x}}\times (xy)^{log\frac{x}{y}}=1.$$

(d) Find the equation of the line having the points (1, 2) and (–2, 0). Are the points (–5, 2) and (2, –5) lie on that line?

(e) If one root of $x^2+rx-s=0$ is square of the other root show that $r^3+s^2+3sr-s=0$.

(f) If *m*th term of a G.P. is *n* and *n* th term is *m*, find (2*m*–*n*)th term of the G.P.

Group D

4. Answer *any three* questions: 10×3=30

(a) (i) If 5th term of an A.P. is 30 and 12th term is 65, find the sum of first 20 terms.

(ii) Find the sum to *n* terms of the series

$4 + 44 + 444 + \ldots\ldots$

(b) (i) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then show that $A^2 = 5A + 2I$ and hence find A^{-1}.

(ii) Solve: $\begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-4 & 2x-9 & 3x-16 \\ x-8 & 2x-27 & 3x-64 \end{vmatrix} = 0$

(c) (i) Evaluate: $\int \frac{x+1}{\sqrt{4+8x-5x^2}}\,dx$

(ii) If $x = a(t + \frac{1}{t})$ and $y = a(t - \frac{1}{t})$, find $\frac{d^2y}{dx^2}$.

(d) (i) If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3 : 5$, then find the value of *n*.

(ii) If α and β be two roots of $x^2 + 3x + 4 = 0$, find the equation whose roots are $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$.

(e) (i) If $4x - 3y = 1$, $3x - 4y + 1 = 0$ and $kx - 7y + 3 = 0$ are concurrent, find the values of *k*.

(ii) Find the centre and radius of the circle $3(x^2 + y^2) = 5x + 6y - 4$.

(f) (i) If $pqr = 1$, then show that

$\frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}} = 1.$

(ii) Solve: $2\log_2 \log_2 x + \log_{\frac{1}{2}}\left(2\sqrt{2}x\right) = 1$
