Sample Paper (Business Mathematics)

Year 2020 Class 12th

(Topic-wise Break Up)

Topic	No.Of 1 Mark Questions	No.Of 2 Marks Questions	No.Of 4 Marks Questions	No of 6 Marks Questions	Total Marks
Matrices and Determinants	01	02	01	01	15
Limits and continuity	---	01	02	---	10
Derivative	01	---	02	01	15
Integration	01	---	02	01	15
Differential Equations	01	02	01	01	15
Application of Integration	---	02	---	01	10
Application of calculas	---	---	01	01	10
Computing	---	01	02	---	10
Total Questions	04	08	11	06	100Marks 29 Questions

- Note for Paper Setters:
- The sample question papers comprises of 29 Questions, divided into (04) four sections A, B,C,D.
- Section A comprises of Multiple Choice Questions from (Q.1 to Q.4) each of 1 Marke
- Section B comprises of 8 questions (Q 5 to Q. 12) each of 2 marks.
- Section C comprises of 11 Questions (Q 13 to Q23) each of 4 marks.
- Section D comprises of 6 Questions (Q24 to Q 29) each of 6 marks.

Subject: Business Mathematics.

Class 12th. Max.Marks=100, Time: 3 hours.

Section A (Multiple Choice Questions) 4Qx1M= 4 marks

Q.No.1) If $x\begin{bmatrix}2\\3\end{bmatrix} + y\begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$ Find the value of x and y.

Q.2) Differentiate $x^2 + xy + y^2$ with respect to x.

Q.3) Write the order of differential Equation $\frac{d^2y}{dx^2}=(\frac{dy}{dx})^3+x$

Q.4) Find $\int \left(x^{\frac{2}{3}} + 1\right) dx$

Section B (very short answer type Question) 8Qx2M=16 marks

Q.5) If $A=\begin{bmatrix}3 & -2\\4 & -2\end{bmatrix}$ and $I=\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$ Find k so that $A^2 = kA - 2I$

.6) If $A=\begin{bmatrix}1 & 2\\4 & 2\end{bmatrix}$ then show that $|2A|=4|A|$

Q.7) Evaluate the $\lim_{x\to 0} \frac{Sinax}{Sinbx}$

Q.8) Define Order and Degree of a differential Equation.

Q.9) Show that y=acosx+bsinx,(Where a,b ϵR) is a solution of differential equation $\frac{d^2y}{dx^2} + y=0$

Q.10) Evaluate the definite integral $\int_2^3 \frac{x}{x^{2+1}}\, dx$

Q.11) Define Computers.

Q.12) Using integration as limit of sum find $\int_1^2 (x + 1)dx$

Sec C (Short Answer Type Questions) 11Qx4M=44 marks

Q.13) Using properties of determinants, prove that $\begin{vmatrix}x+4 & 2x & 2x\\2x & x+4 & 2x\\2x & 2x & x+4\end{vmatrix} = (5x + 4)(4 - x)^2.$

(OR) Using properties of determinants show that $\begin{vmatrix}-a^2 & ab & ac\\ba & -b^2 & bc\\ca & cb & -c^2\end{vmatrix}=4a^2b^2c^2$

Q.14) Evaluate $\lim_{z\to 1} \frac{z^{1/3}-1}{z^{1/6}-1}$

Q.15) If y= 5cosx-3sinx prove that $\frac{d^2y}{dx^2} + y = 0$

Q.16) Write the steps of calculating LCM and HCF of 340 and 510 by using computer algorithm.

Q.17) If $y=x^x - 2^{Sinx}$ find $\frac{dy}{dx}$

Q.18) Find $\int \frac{e^{2x}-1}{e^{2x}+1} dx$

19) Find $\int \frac{3x^2}{x^6+1} dx$

20) Find the particular solution of the differential equation $x(x^2 - 1)\frac{dy}{dx} = 1$, y=0 ,x=2 (OR)

Find the general solution of the differential equation $\frac{dy}{dx} + 2y = Sinx$

Q.21) The total revenue in rupees received from the sale of x units of a product is given by $R(x)=13x^2 + 26x + 15$.Find the marginal revenue when x=7.

Q.22) What is the significance of computers with reference to solution of business problems?

Q.23) An article was sold at its marked price of Rs 6200 and a discount of 15% was allowed .The dealer still made a profit of 20%.Find the cost price.

Section D (Long Answer Type Questions) 6Qx6M=36marks

Q.24) Using Matrix Method to solve the system of equations x-y+z=4 ;2x+y-3z=0 ; x+y+z=2 (OR)

Solve the system of equations by Cramer's Rule

2x+3y+3z=5, x-2y+z=-4, 3x-y-2z=3

Q.25) Find the values of 'a' and 'b' such that the function defined by:

$$f(x)=\begin{cases} 5 & ,x \leq 2 \\ ax+b, & 2 < x < 10 \\ 21, & x \geq 10 \end{cases}$$ is a continues function.

Q.26) Evaluate $\int \frac{1}{\sqrt{7-6x-x^2}} dx$

(OR)

Find the area of the region enclosed by the curve $\frac{x^2}{a^2}+\frac{y^2}{b^2} = 1$

Q.27) Integrate using properties of definite integrals $\int_0^{\frac{\pi}{2}} \frac{Sin^{3/2}x}{Sin^{3/2}x+Cos^{3/2}x} dx$

(OR)

Evaluate $\int_{-5}^{5} |x+2|\, dx$

Q.28) A firm has demand function P=108-5Q and the Cost function $C=-12Q+Q^2$.Find the price at which the profit is maximum. Also find the maximum profit.

(OR)

The marginal revenue function is given by $M(x)=3-2x-x^2$; x being the output.Find the total revenue function and demand function.

Q.29) In a bank principal increases continuously at the rate of 5% per year. An amount of Rs 1000 is deposited with the bank. How much will it worth after 10 years (Given $e^{0.5} = 1.648$)

(OR)

A firm has the revenue function p=12-3q and the cost function.$T=q^2 + 2q$.Find AC, AR, MC and MR.