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BBSC-02

BBA (Semester-I)
Examination, July-December, 2025
(Session : 2025-26) (NEP-2020)
MANAGEMENT
Business Mathematics

Time Allowed : Three Hours

Maximum Marks : 70

Note : Attempt questions from each section as directed.

Section-A

Note : Answer the all questions : [10×1=10]

Q.1. If A is a 2×3 matrix and B is a 3×4 matrix, then order of AB is:

(a) 2×4

(b) 3×3

(c) 4×2

(d) 2×3

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Q.2. The value of the determinant $\begin{vmatrix} 3 & 2 \\ 1 & 4 \end{vmatrix}$ is :

(a) 12

(b) 5

(c) 10

(d) 8

Q.3. The solution of the equation $7x - 21 = 0$ is :

(a) 21

(b) 7

(c) –3

(d) 3

Q.4. The roots of the quadratic equation $x^2 - 9 = 0$ are :

(a) ± 9

(b) 0, 9

(c) ± 3

(d) –9 only

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Q.5. The $(8^3 \times 8^2)$ is equal to :

(a) 8^6

(b) 8^5

(c) 8^7

(d) 8^1

Q.6. $\log_{10}(1)$ equals :

(a) 0

(b) 1

(c) 10

(d) Undefined

Q.7. The average of 5, 15, and 25 is :

(a) 10

(b) 15

(c) 20

(d) 12

Q.8. Ratio of 50 to 200 is :

(a) 1:2

(b) 1:3

(c) 1:4

(d) 4:1

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Q.9. Compound Interest on ₹1,000 at 10% p.a. for 1 year is :

(a) ₹105

(b) ₹110

(c) ₹90

(d) ₹100

Q.10. A shopkeeper incurs loss when :

(a) SP > CP

(b) SP = CP

(c) SP < CP

(d) None of the above

Section-B

(Short Answer Type Questions)

Note : Answer **any five** of the following short answer type questions : [5×4=20]

Q.1. Find the inverse of the matrix

$$A = \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$$

using the adjoint method.

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Q.2. Explain the elementary row operations and use them to reduce the following matrix to row-echelon form :

$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 1 & 1 & 2 \end{pmatrix}$$

Q.3. Solve the system of equations using the elimination method :

$$3x + 4y = 10$$
$$5x - 2y = 6$$

Q.4. A person travels 60 km by bus at 30 km/h and returns by car at 60 km/h. Find the average speed for the whole journey.

Q.5. A shopkeeper marks a product at ₹800 and gives a discount of 20%. He still earns a profit of 10% Find the cost price.

Q.6. A bill of ₹12000 is due in 6 months. What is its present worth at 8% simple interest?

Section-C

(Descriptive Answer Type Questions)

Note : Answer **any one** question from each unit. [4×10=40]

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UNIT-I

Q.1. From the given matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & 0 \\ 1 & 5 \end{bmatrix}$$

(a) Compute AB and BA.

(b) Verify whether AB = BA.

(c) Interpret why most matrices do not commute under multiplication.

Q.2. Using the matrix

$$C = \begin{bmatrix} 2 & -1 & 3 \\ 0 & 2 & 5 \\ 4 & 1 & k \end{bmatrix}$$

(a) Find the value(s) of k for which the matrix becomes singular.

(b) Find its determinant for those values of k.

(c) Interpret what singularity implies for solving linear systems.

UNIT-II

Q.3. Solve the quadratic equation :

$$5x^2 - 17x + 6 = 0$$

Using the factorization method, quadratic formula, and completing the square method verify that all three methods give the same roots.

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Q.4. Using logarithms (log tables), evaluate :

$$\frac{(125.6)(0.00437)}{(2.18)^2}$$

Show detailed steps :

(i) converting to standard form

(ii) characteristics and mantissa

(iii) use of log table

(iv) anti-log

(v) final rounding.

UNIT-III

Q.5. A bus travels the following distances at different speeds:

60 km at 40 km/h

80 km at 50 km/h

100 km at 25 km/h

(a) Calculate the average speed for the entire journey.

(b) Also compute the harmonic mean of the three speeds and interpret the result.

(c) Compare both speeds and explain which measure is more appropriate.

Q.6. A trader sells two items :

He gains 20% on the first item.

He loses 10% on the second item.

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The selling prices of both items are equal at ₹1,500 each.

(a) Find the Cost Price of each item.

(b) Compute the overall profit or loss%.

(c) Interpret why equal SP does not guarantee equal gains.

UNIT-IV

Q.7. A sum of ₹75,000 is invested for 3 years at 8% per annum.

Compute the following :

(a) Simple Interest and Amount

(b) Compound Interest and Amount (Compounded annually)

(c) Difference between SI and CI

(d) Real-life interpretation of compounding effect

Q.8. A machinery worth ₹1,20,000 is purchased on loan at 9% p.a. compounded annually. The buyer agrees to pay three equal annual installments.

Find the annual installment using annuity formula

$$A = P\frac{r(1+r)^n}{(1+r)^n - 1}$$

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