

BUSINESS MATHS- 18UCO3A5

K1-LEVEL QUESTIONS

UNIT-I

1. The amount borrowed by the debtor is called.....
[a] **Principal** [b] Creditor [c] Borrower [d] Del creditor
2. Rate of interest is denoted by.....
[a] r [b] **i** [c] n [d] p
3. $I = \dots\dots\dots$
[a] **$Pnr/100$** [b] $100I/nr$ [c] $100I/pr$ [d] $100I/pn$
4. The fall or decrease in value is called.....
[a] **depreciation** [b] annuity contingent [c] annuity certain [d] sinking fund
5. The difference between bankers discounts and true discount is.....
[a] Cash value [b] Face value [c] **Bankers gain** [d] Exchange value
6. Cash/exchange value =
[a] **A-B.D** [b] $A+B.D$ [c] $A-T.D$ [d] $A+T.D$
7. The fees or charges paid by the borrowers for using the money of the lender is called.....
[a] unit of time [b] **interest** [c] amount [d] debtor
8.annuity the payment is to be made forever.
[a] **perpetual annuity** [b] annuity due [c] immediate annuity [d] none of the above
9. When the payments fall due at the beginning of each interval, the annuity is called.....
[a] perpetual annuity [b] **annuity due** [c] immediate annuity [d] none of the above
10. When the payments fall due at the beginning of each interval, the annuity is called.....
[a] perpetual annuity [b] annuity due [c] **immediate annuity** [d] none of the above

UNIT-II

1. If the successive term increases or decreases by a constant, the series is called.....

[a] Geometric Progression [b] **Arithmetic Progression** [c] Harmonic Progression
[d] Common Difference

2. If the successive term increases or decreases by a constant factor, the series is called.....

[a] **Geometric Progression** [b] Arithmetic Progression [c] Harmonic Progression
[d] Common Difference

3. The sum of the first n terms of a G.P.....

[a] $S_n = a[r^n - 1]/r - 1$ [b] $S_n = a[r^n + 1]/r - 1$ [c] $S_n = a[r^n - 1]/r + 1$ [d] $S_n = a[r^n + 1]/r + 1$

4. A set of numbers arranged in a specific order in a sequence is called.....

[a] **Term** [b] Series [c] AP [d] GP

5. The successive terms of a sequence are connected by plus or minus sign the sequence is called as.....

[a] Term [b] **Series** [c] AP [d] GP

6. If there is a specific number of elements in a set is called.....

[a] **Finite set** [b] Infinite set [c] Void set [d] Improper subset

7. A set which has no element is called.....

[a] Finite set [b] Infinite set [c] **Void set** [d] Improper subset

8. $A - [B \cap C] =$

[a] $[A - B] \cap [A - C]$ [b] $[A - C] \cup [A - B]$ [c] **$[A - B] \cup [A - C]$** [d] $[A - C] \cup [B - C]$

9. If there are countless elements in a set is called.....

[a] Finite set [b] **Infinite set** [c] Void set [d] Improper subset

10. Null set is a of every set

[a] **Subset** [b] improper set [c] proper set [d] all the above

UNIT-III

1. is an arrangement of elements in rows and columns.

[a] Determinants [b] Input and output analysis [c] Square matrix [d] **Matrix**

2. When the number of rows and the number of columns in a matrix are equal, the matrix is called.....

- [a] **Square matrix** [b] row matrix [c] column matrix [d] null matrix
3. When there is only one row in the matrix, the matrix is called.....
- [a] Square matrix [b] **row matrix** [c] column matrix [d] null matrix
4. When there is only one column in a matrix, the matrix is called.....
- [a] Square matrix [b] row matrix [c] **column matrix** [d] null matrix
5. When there is no element in the matrix, the matrix is called.....
- [a] Square matrix [b] row matrix [c] column matrix [d] **null matrix**
6. A square matrix those diagonals are 1 and non diagonals are zeros is called.....
- [a] Square matrix [b] row matrix [c] column matrix [d] **unit matrix**
7. If A and B is matrices of the same order ($A+B=B+A$) it is called.....
- [a] **Commutative** [b] associative [c] distributive with respect to scalar
[d] cancellation law
8. If A, B and C are matrices of the same order ($(A+B)+C=A+(B+C)$) it is called.....
- [a] Commutative [b] **Associative** [c] Distributive with respect to scalar
[d] cancellation law
9. The value of remain unchanged if rows changed into columns.
- [a] **Determinants** [b] Matrix [c] Commutative [d] none of the above
10. Cramer's rule is named in the honor of
- [a] **Swiss mathematician** [b] German mathematician [c] Italy mathematician
[d] Indian mathematician

UNIT-IV

1. is the limiting value of the change in the dependent variable divided by the change in the independent variable.
- [a] integral [b] **differential** [c] limits [d] none of the above
2. $\log_{mn} = \dots\dots\dots$

[a] **log m + log n** [b] log m- log n [c] n log m [d] 0

3. $\log(m/n) = \dots\dots\dots$

[a] log m + log n [b] **log m- log n** [c] n log m [d] 0

4. $\log(m^n) = \dots\dots\dots$

[a] log m + log n [b] log m- log n [c] **n log m** [d] 0

5. $\log_a 1 = \dots\dots\dots$

[a] log m + log n [b] log m- log n [c] n log m [d] **0**

6. $d/dx(x^n) = \dots\dots\dots$

[a] **$n x^{n-1}$** [b] $n x^n$ [c] $n x^{n+1}$ [d] $n x^{n/1}$

7. $\log x = \dots\dots\dots$

[a] **$1/x$** [b] x [c] 1 [d] 0

8. $e^x = \dots\dots\dots$

[a] e [b] x [c] 0 [d] e^x

9. $d/dx (x^2-7)^2 = \dots\dots\dots$

[a] $4x^3-28$ [b] **$4x^3-28x$** [c] $4x^2-28x$ [d] $4x^3-26x$

10. $d/dx \sqrt{x} = \dots\dots\dots$

[a] **$1/2\sqrt{x}$** [b] $1/x$ [c] $1/2x$ [d] x

UNIT-V

1.is the inverse process of differentiation.

[a] **integral** [b] differential [c] limits [d] none of the above

2. F(x) is called.....

[a] integral [b] anti derivative [c] primitive [d] **all the above**

3. The process of finding the integral of a function is called as.....

[a] differential [b] **integration** [c] primitive [d] none of the above

4. $\int x^n dx = \dots\dots\dots$

- [a] $x^{n+1}/n+1 -c$ [b] $x^{n-1}/n+1 +c$ [c] $x^{n+1}/n+1 +c$ [d] $x^{n+1}/n-1 +c$

5. $\int 1/x \, dx = \dots\dots\dots$

- [a] **$\log_e x +c$** [b] $\log_e x -c$ [c] $\log_e +c$ [d] none of the above

6. $\int e^x \, dx = \dots\dots\dots$

- [a] e^x [b] **$e^x +c$** [c] $e+c$ [d] $e^x -c$

7. $\int x^{1/2} \, dx = \dots\dots\dots$

- [a] **$3/2$** [b] 3 [c] $2/3$ [d] 2

8. $\int 1 \, dx = \dots\dots\dots$

- [a] kx [b] x [c] **$kx+c$** [d] 0

9. $\int e^x -1 \, dx = \dots\dots\dots$

- [a] $e-x+c$ [b] $e^x -x$ [c] $e^x +x+c$ [d] **$e^x -x+c$**

10. $1/\sqrt{x} = \dots\dots\dots$

- [a] $2\sqrt{x}$ [b] **$2\sqrt{x}+c$** [c] $2x+c$ [d] $\sqrt{x}+c$

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K2-LEVEL QUESTIONS

UNIT-I

1. Write down the formula for simple interest.

ANSWER: $I = Pnr/100$

2. Write down the formula for compound interest.

ANSWER: $A = P[1 + r/100]^n$

3. What is amount of an immediate annuity?

ANSWER: Payment falls due at the end of the year

4. What is depreciation?

ANSWER: The fall or decrease in the value is called depreciation

5. What is banker gain?

ANSWER: The difference between bankers discount and true discount is called bankers gain.

6. What is present value?

ANSWER: The sum of current value of all the installment payments.

7. List out the two types of bills.

ANSWER: Bill of exchange after date and bill of exchange after sight.

8. Write a formula for true discount.

ANSWER: $T.D = Pnr/100$ (or) $B.D - B.G$ (or) $Anr/100 + nr$

9. List out the difference between the face value and cash value.

ANSWER: Face value is the value due on the legally due date from the bill of exchange is its face value or the amount due. Cash value is the amount which bankers or a broker pays a bill of exchange while discounting.

10. Write a formula for present value of an annuity due.

ANSWER: $V = A + A/i[1 - (1 + I)^{-(n-1)}]$

UNIT-II

1. List out the two types of series

ANSWER: Arithmetic series and Geometric series

2. Write down the formula for $[a+b]^2$.

ANSWER: a^2+b^2+2ab

3. Find the sum of the series $0.7+0.07+0.007+\dots$ to infinity.

ANSWER: $7/9$

4. Write the formula for the sum of the first n term of a G.P

ANSWER: $S_n = a[r^n - 1]/r - 1$

5. Write the formula for the sum of the first n term of a A.P

ANSWER: $S_n = n/2[2a + (n-1)d]$

6. What is set?

ANSWER: A set is a collection of well defined objects.

7. List out any four types of set.

ANSWER: Finite set, infinite set, empty set and singleton set

8. List out the types of subset.

ANSWER: Proper subset and improper subset

9. What is null set?

ANSWER: a set which has no element is called null set

10. What is singleton set?

ANSWER: If there is only one element in the set is called singleton set

UNIT-III

1. What do you mean by square matrix?

ANSWER: When the number of rows and the number of columns in a matrix are equal, the matrix is called square matrix.

2. What is zero matrixes?

ANSWER: When there is no element in the matrix, the matrix is called zero matrixes.

3. If $A = \begin{bmatrix} 3 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \end{bmatrix}$ find AB

ANSWER: 29

4. Write down the formula for inverse of matrix.

ANSWER: $A^{-1} = 1/\text{DETERMINANT OF } A (\text{ADJ } A)$

5. What is minor and cofactor.

ANSWER: Minor is a element of a determinant is the value of the lower order determinant obtained by deleting the rows and column. Cofactor is the element of A_{ij} .

6. What is scalar matrix?

ANSWER: Diagonal matrixes in which all the element in the diagonals are equal are called scalar matrixes.

7. What is diagonal matrix?

ANSWER: A square matrix all of those elements except those in the principal or leading or main diagonals are zeros is called a diagonal matrix.

8. List out the properties of matrix.

ANSWER: Addition of matrix, multiplication of matrix and existence of inverse.

9. When the linear equation is said to be inconsistent?

ANSWER: If it has no solution.

10. When the linear equation is said to be consistent?

ANSWER: If it has at least one solution.

UNIT-IV

1. What do you understand from the term derivative

ANSWER: Derivative is the limiting value of the change in the dependent variable divided by the change in the independent variable.

2. Write down the formula for x^n

ANSWER: $n x^{n-1}$

3. Find the derivate of x^5

ANSWER: $5x^4$

4. Write down the formula for price elasticity if demand.

ANSWER: $n_d = -p/x [1/ dp/dx]$

5. Write down the formula for price elasticity of supply.

ANSWER: $n_s = p/x [1/ dp/dx]$

6. Write down the formula for average revenue.

ANSWER: $AR = \text{total revenue} / \text{number of units sold}$

7. Write a formula for average cost.

ANSWER: $AC = \text{total cost} / \text{number of units}$

8. If the demand function is $p=4-5x$ for which value of x will elasticity of demand be unitary?

ANSWER: $x=0.4$

9. If the marginal revenue is Rs.25 and the elasticity of demand with respect to price is 2, then the average revenue is?

ANSWER: 50

10. $d^2y/dx^2 < 0$ then y is said to be?

ANSWER: maximum

UNIT-V

1. Integrate x^1

ANSWER: $X^2/2+C$

2. Evaluate $\int 3^2 - 8x + 5] dx$

ANSWER: $X^3 + 4X^2 + 5X + C$

3. What is integration?

ANSWER: The process of finding the integral of a function.

4. What is consumer surplus?

ANSWER: The total benefit derived by the consumer who pays more than the equilibrium price is called consumer surplus.

5. Integrate with respect to x . e^{7x}

ANSWER: $1/7 e^{7x} + c$

6. Write down the formula for $\int x^n dx$.

ANSWER: $x^{n+1}/n+1 + c$

7. Write down the formula for consumer surplus.

ANSWER: $\int_0^{q_0} f_1(q) dq - p_0 q_0$

8. Write down the formula for producer surplus.

ANSWER: $p_0 q_0 - \int_0^{q_0} f(q) dq$

9. What is producer surplus?

ANSWER: The total gain to the producer who supplies a community at prices more than the equilibrium price is called producer surplus.

10. Integrate $\sqrt{e^x} x^3 dx$

ANSWER: $e^{x/2}(x^3 - 3x^2 + 6x - 6)$

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K3-LEVEL QUESTIONS

UNIT-I

1. Find the simple interest on the sum of Rs.6,000 at 10% for 3 years.
2. Rs.6,000 amounts to Rs.8,940 at 14% interest. Find the number of year for which the amount lent.
3. A sum of money amounted to Rs1,071 in 6 months and Rs1,106 in 16 months. Calculate the rate of simple interest.
4. Mr. Ambigapathy borrows Rs1,00,000 at 24% compounded monthly. Find the amount he has to repay at the end of 3 years.
5. Find the effective rate of interest equivalent to a nominal rate of 12% p.a compounded monthly.
6. What amount lent at 10% p.a. compound interest will fetch Rs.630 as interest in 2 years?
7. Find the cash value of a bill of Rs.4,200 due 5 months hence at 75% p.a.
8. In a company a machine costs Rs.80,000 and its life is estimated to be 20 years. Sinking fund is created for replacing the machine at the end of its life time when its scrap realizes a sum of Rs5,000 only. Calculate the amount which should be provided every year for the sinking fund if it accumulates at 9% p.a compounded annually.
9. The bankers gain on a sum due 10 months. Hence at 6% p.a is Rs25. Find the sum due.
10. Find the term of a bill of Rs18,360 whose true discount at 8% p.a is Rs.360.

UNIT-II

1. The first term of an Arithmetic series is 5. The number of terms is 15 and their sum is 390. Find the common difference and the middle term.
2. Find the sum of the following series $8+13+18+\dots$ upto 23
3. The fourth and seventh terms of an A.P are 3 and 36. Find the A.P and its fifteenth term.
4. Find the 6th term of the G.P 1,2,4.....
5. Find the number of terms in the geometric series $0.03+0.06+0.12+\dots+1.92$
6. If $A=\{0,1,2\}$ $B=\{1,3,4\}$ $C=\{7,8\}$ find $A \cup (B \cap C)$ and $(A \cup B) \cap C$
7. If $A=\{1,2,4,6,8\}$, $B=\{2,3,4,5,6\}$, $C=\{3,6,9,12,15\}$ find $A \cap B$ and $C \cap A$
8. Prove $(A \cup B)' = A' \cap B'$

9. If $A=\{1,2,3,4\}$ $B=\{3,4,5,6\}$ and $U=\{0,1,2,3,4,5,6,7,8,9\}$ then verify that $A-B=A \cap B' = B' - A'$

10. If $A=\{1,3\}$ and $B=\{5,6,7\}$ find $A \times B$, $B \times B$, $A \times A$

UNIT-III

1. If $A = \begin{pmatrix} 4 & 7 \\ 2 & 3 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 \\ -6 & 9 \end{pmatrix}$ find AB and BA .

2. Verify that $B^T A^T = (AB)^T$ when $A = \begin{pmatrix} 1 & 1 & 2 \\ 2 & 1 & 0 \end{pmatrix}$ $B = \begin{pmatrix} 1 & 2 \\ 2 & 0 \\ -1 & 1 \end{pmatrix}$

3. Solve the following equations by cramer's rule

$$3x+2y=8; \quad 5x-3y=7$$

4. Find the minor and co factor of all the elements of $\begin{pmatrix} 3 & 2 \\ 5 & 0 \end{pmatrix}$

5. Find the inverse of $A = \begin{pmatrix} 2 & 2 \\ 3 & 5 \end{pmatrix}$

6. If $A = \begin{pmatrix} 2 & 3 \\ 10 & 15 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 7 \\ 8 & 24 \end{pmatrix}$ find $A+B, A-B$

7. If $A = a$ find the value of $-4A+5A'$.

8. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2 - 5A + 7I_2 = 0$

9. Solve by inverse matrix. $2x-3y=1; x+5y=7$

10. Find the rank of $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{pmatrix}$

UNIT-IV

1. Find $\frac{dy}{dx}$ $y = 5x^9 - 2$

2. Differentiate the following with respect to x
 $x^5 + 3\log x - 4e^x$

3. Differentiate the following with respect to x $x^3 - 3x^2 + 4x + 3$

4. Differentiate the following $1/x^5 + 1/\sqrt{x} + x^4$

5. Find the derivative $y = (x^2 + 5)(3x + 1)$

6. If $C(x)$ rupee is the total cost of manufacturing x toys and $C(x) = 500 + 50/x + x^2/10$, find the average cost and the marginal cost when $x=20$.
7. Find the derivate of e^{2+5x} .
8. Find the derivates of $3x^2 - x^2 + 8/x$
9. The demand curve for a monopolist is given by $x=100-4p$. Find the total revenue, average revenue and marginal revenue. At what level of x , the marginal revenue is equal to zero?
10. Find the elasticity of supply from the supply function $p=2+5x$.

UNIT-V

1. Evaluate $\int (x^3 + 4x^2 - 5x - 6)dx$
2. Evaluate $\int 1/x^2 dx$
3. Evaluate $\int \sqrt{x} dx$
4. Evaluate $\int 3x^2 - 4x dx$
5. Integrate with respect to x e^{7x}
6. Evaluate $\int 8x^2 dx / 2x^2 - 3$.
7. Evaluate $\int \log x dx$.
8. The marginal cost of a product having output of a q units is $90 - 12q + 0.3q^2$. Find the total and average cost function of the firm when its fixed cost is Rs.200.
9. If the demand function of a commodity is $p=36-x^2$. Find the consumers surplus for $p=11$.
10. Determine the cost of producing 200 cars, if the marginal cost is given be $MC(x)=15/2(x^2)-4x+8000$. What is the cost of production of one car?

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K4-LEVEL QUESTIONS

UNIT-I

1. Mr. Puthiyanayagam has two daughters A and B aged $10\frac{1}{2}$ and 16 years. He has Rs 1,80,000 with him now but wants that both of them should get equal amount when they are 18 years old. How he should divide the money if it were to be deposited with his friends who gives only 5% simple interest per annum.
2. The difference between the compound interest and the simple interest for 3 years at 5 % p.a on a certain sum of money was Rs610. Find the sum.
3. A person wishes to collect Rs1,20,000 for a houses at the time of retirement due after 18 years. If the rate of compound interest is 6% p.a, how much should he deposit annually to receive this amount?
4. A bill for Rs1,825 was drawn on 22nd jan at 6 months date and discounted on 16th april at the rate of 10% pa. find the sum for which the bill was discounted and the bankers gain.
5. Find the bankers gain on a bill of Rs2,000 for 4.5 months at 4%p.a.

UNIT-II

1. Find the three numbers in A.P whose sum is 12 and the sum of whose cubes is 408.
2. Two posts are offered to a person. The first carries a starting salary of Rs1,000 per month and an annual increment of Rs 40. The second carries a starting salary of Rs800 and an annual increment of Rs.50. Assuming that he works for 25 years, which of two is more profitable?
3. Find the sum $7+77+777+.....$
4. In the class of 200 students appearing in an examination, 140 passed in mathematics and 100 students passed in statistics. If 40 of them failed in both mathematics and statistics, what percentage of students passed (i) at least in one of the two subjects? (ii) in both the subjects?.
5. Out of a group of 60 students, 25 plays cricket, 30 plays football, 24 play hockey, 10 plays cricket and football, 9 play cricket and hockey, 12 plays hockey and football and 5 plays all the three. Use venn diagram to show how many play only one game.

UNIT-III

- Find $\begin{vmatrix} 4 & 2 & 0 & 8 \\ 1 & -1 & 3 & 6 \\ 7 & 2 & 1 & 4 \end{vmatrix}$
- Find the following system of simultaneous equation by creamer's rule
 $2x+3y+3z=22$ $x-y-z=4$ $4x+2y-z=9$
- Find the minor and cofactor of all the elements of $\begin{vmatrix} 5 & 6 & 7 \\ 0 & 1 & -3 \\ -2 & 4 & 9 \end{vmatrix}$
- Show that the matrix $A = \begin{vmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{vmatrix}$ satisfy the equation $A^3 - 6A^2 + 9A - 4I = 0$. Hence, deduce the value of A^{-1} .
- Find the rank of $\begin{vmatrix} 3 & 2 & -1 \\ 7 & 8 & 0 \\ 4 & 6 & 1 \end{vmatrix}$

UNIT-IV

- Find the derivatives $y = (x^2 + 5)(3x + 1)$
- Differentiate the following with respect to x
 x^x
- Find $d/dx [\log_e \{x^2 - 1\}]$
- Find for what values of x , the following expression is maximum and minimum respectively
 $2x^3 - 21x^2 + 36x - 20$
- The total cost function of a firm is given by $c = 0.04q^3 - 0.9q^2 + 10q - 10$.

UNIT-V

- Evaluate $\int x^3/[x^2+1]^3 dx$
- Evaluate $\int x dx/[x-1][2x+1]$
- Using partial fractions, solve $\int x^2+x+1 dx/[x-1]^2[x-2]$
- Integrate $x^2-x+10/[2x+1][x^2+7x+12]$
- The marginal cost function of a firm for a certain product is $5+x+2x^2$. Find the total cost and average cost functions if the fixed cost is 200.

