

FOUNDATION COURSE EXAMINATION

June 2016

P-4(FBMS)
Syllabus 2012

Fundamentals of Business Mathematics and Statistics

Time Allowed: 3 Hours

Full Marks: 100

*The figures in the margin on the right side indicate full marks.
Notations and symbols used are as usual.*

Section A

1. Answer any two questions: 5×2=10
- (a) The difference between the compound interest and the simple interest on a sum put out for 2 years at 10% was ₹ 500. Find the sum.
- (b) Simplify: $[\{(1 - 0.1)^{-1} - 1\}^{-1}]^{-\frac{1}{2}}$.
- (c) The average cost function (AC) for a certain commodity is given by $AC = 2q^2 - 36q + \frac{70}{q}$ in terms of output q . Find the value of q for which the marginal cost is a minimum.
2. Answer any two questions: 3×2=6
- (a) In an A.P. the sum of first 16 terms is 80 and the 16th term is 20. Find the sum of first 26 terms.
- (b) Solve for x : $(\log_{10} x)^2 - 5 \log_{10} x = 2(1 - 2 \log_{10} x)$.
- (c) Find $A + A'$ where the matrix $A = \begin{bmatrix} 5 & 6 & -3 \\ 5 & 7 & 2 \\ -9 & 8 & 11 \end{bmatrix}$, and A' is the transpose of A .
3. Choose the correct answer: 1×5=5
- (a) What number is to be added to each term of the ratio 7 : 9 to equal 15 : 16?
- (i) 23 (ii) 16 (iii) 31 (iv) 13.
- (b) If $x \propto y$ and $x = 2$, then $y = 4$, when $x = 3$, the value of y is
- (i) $\frac{1}{6}$ (ii) $\frac{1}{2}$ (iii) 6 (iv) 2.
- (c) If ${}^5C_r = {}^5C_{r+1}$, then 7C_2 is
- (i) 1 (ii) 2 (iii) 0 (iv) 3.
- (d) If $f(x + 1) = 3x - 4$, then $f(x)$ is
- (i) $3x + 2$ (ii) $3x - 7$ (iii) $4x - 3$ (iv) $3x - 1$

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(e) If $\int_1^2 k dx = 4$, (where k is a constant), then the value of k is

- (i) 4 (ii) 2 (iii) 0 (iv) -3

4. Fill in the blanks:

1×5=5

(a) The range of x for which the function $3x^3 - 9x$ is a decreasing function of x is _____.

(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$, then determinant of A is _____.

(c) If $y = e^{2 \log x}$, then $\frac{dy}{dx}$ is _____.

(d) If the sum of the roots of the quadratic equation $(m + 1)x^2 + 2mx + 1 = 0$ be 1, then the value of m is _____.

(e) The ninth term of the sequence 1, 3, 9, 27, 81, is _____.

5. State whether the following statements are true (T) or false (F):

1×5=5

(a) $(1 + 2 + 3 + \dots + n)^2 = 1^3 + 2^3 + 3^3 + \dots + n^3$.

(b) The null set is a subset of every set.

(c) If a function is continuous at $x = 1$, then $\lim_{x \rightarrow 1} f(x) \neq f(1)$.

(d) $\frac{d}{dx}$ of a constant function is zero.

(e) The value of 2° is 2.

6. Match the following:

1×5=5

(a) If the matrix $\begin{bmatrix} 2 & 3 \\ -4 & -k \end{bmatrix}$ be singular the value of k is	(i) $\frac{3}{2}$
(b) if ${}^n P_2 = 20$, the value of n is	(ii) 4
(c) The third term of the expansion $\left(\frac{2x}{3} - \frac{3}{4x}\right)^4$ is	(iii) 6
(d) If $n(A) = 15$, $n(B) = 20$ and $n(A \cup B) = 22$, then $n(A \cap B)$ is	(iv) 5
(e) $\int_0^2 x^3 dx =$	(v) 13

