



KERALA AGRICULTURAL UNIVERSITY
B.Sc. (Hons.) Forestry 2018 Admission
I Semester Final Examination-February 2019

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Basic Mathematics (2+0)

Marks:50

Time: 2 hours

Fill in the blanks:

(10x1=10)

- 1 The total number of terms in the expansion of $[(a + b^2)]^{18}$ is _____
- 2 The A.M. between two numbers is 5 and the G.M is 4. Then H.M. between them is _____
- 3 The relation between nP_r and nC_r is _____
- 4 The modulus of the complex number $2 + i\sqrt{3}$ _____
- 5 The inverse of $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$ is _____
- 6 If the elements below the leading diagonal are zeros then the matrix is called _____
- 7 One radian is equal to (in terms of degree) _____
- 8 $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$ is _____
- 9 The condition for the function $y = f(x)$ to be increasing is _____
- 10 $\int u dv$ is _____

Write Short notes on ANY FIVE of the following

(5x2=10)

- 1 Difference between Permutation and Combination.
- 2 Write any two properties of the conjugate of the complex numbers.
- 3 Limit of a function.
- 4 Properties of transpose of a matrix.
- 5 If the A.M between two numbers is 1, prove that their H.M is the square of their G.M.
- 6 Necessary and sufficient condition for the function $y = f(x)$ to be maximum or minimum.
- 7 Properties of definite integral.(any two)

P.T.O

III

Answer ANY FIVE of the following

(5x4=20)

- 1 If $z_1 = 2 + i, z_2 = 3 - 2i$ and $z_3 = -\frac{1}{2} + \frac{\sqrt{3}}{2}i$ Find the conjugate of (i) $z_1 z_2$ (ii) $(z_3)^4$
- 2 Types of matrices with example.
- 3 Find the constant term in the expansion of $\left(\sqrt{x} - \frac{2}{x^2}\right)^{10}$
- 4 If $A + B = 45^\circ$, show that $(1 + \tan A)(1 + \tan B) = 2$ and hence deduce the value of $\tan\left(22\frac{1}{2}^\circ\right)$
- 5 For the response function $y = 3000 + 5x - 0.04x^2$, obtain the level of fertilizer(x) application for which yield (y) is maximum and find the maximum yield.
- 6 If the 5th and 12th term of a H.P is 12 and 10 respectively, find the 15th term.
- 7 Evaluate: (i) $\int \frac{1}{x^2 - 9x + 20} dx$. (ii) $\int \frac{1}{4 - 25x^2} dx$

IV

Answer ANY ONE of the following

(1x10=10)

- 1 a Find the inverse of the matrix $A = \begin{bmatrix} 10 & 13 & 1 \\ 2 & 3 & 1 \\ 2 & -4 & 0 \end{bmatrix}$
- b The growth function of MCU5 and LRA varieties are given below $w = 4.2 e^{0.2t}$ and $w = 2.5 e^{0.2t}$ where w is the dry matter production in gms/plant and 't' measured in days. By estimating the AGR and RGR of the cotton varieties on 20th day show that RGR is more useful measure than AGR.
- 2 a Show that $3(\sin x - \cos x)^4 + 6(\sin x - \cos x)^2 + 4(\sin^6 x + \cos^6 x) = 13$
- b One unit of commodity A is produced by using 1 unit of land, 2 units of labour and 3 units of capital. For producing 1 unit of commodity B, 2 units of land, 3 units of labour and 1 units of capital are required. For producing 1 unit of commodity C, 3 units of land, 1 unit of labour and 4 units of capital are required. If the prices (₹) per unit of these commodities are 14, 11 and 17 respectively. Find the rent (I), Wage (w) and the interest (x) using matrix inverse method.
