1st Internal Test -2019

Subject – Mathematics, **B.Sc./B.A. (Voc.) In Computer Applications**
B.N. College, Patna University
Full Marks 7.5

Time – 30 minutes

Group A (Multiple Choice Questions.) (Answer all) (0.5 marks each):

1) (i) If $y = x^n$ then y_n

(a) $n!$ (b) $(n+1)!$ (c)0 (d) None of the these

(ii) If $y = \log x$ then y_1

(a) $\frac{\pi}{2}$ (b) $\frac{1}{x}$ (c) 0 (d) None of the

(iii) Which of the following is an empty set?

(a)A={x: x is a prime number greater than 99}. (b)B={x: x^2=4, x is even}.

(c) C={x: x^2-2=0 and x is rational number}. (d) D={x: 1<x<3 and x is a natural number}

(iv) Which of the following is an infinite set?

(a)The set of all trees on earth (b) The set of all water drops in an ocean.

(c) The set of solutions of the equation x^2-16=0. (d)None of the above.

(v) The value of $\lim_{\theta \to 0} \frac{\sin\theta}{\theta}$ is

(a) $\frac{\pi}{2}$ (b) e (c) o (d) None of the

Group B (Short Type Question)- Answer any two questions. (1.5 marks each):

(2) (i) Find (nth derivative) i.e. y_n if $y = x^m$

(ii)) If $y = \sin^{-1} x$ then prove that $(1-x^2)y_2 - xy_1 = 0$. (iii) Evaluate $\lim_{x \to 0}\left(\frac{\tan}{x}\right)^{\frac{1}{x}}$

(iv) If A={-1,1}. Find A X A (v) Show that XUY=X∩Y implies X=Y.

Group C (Long Type Question)- Answer any one question. (2 marks each):

3. (i) State and prove **Leibnitz theorem** on successive differentiation.

(ii) State and prove **Euler's theorem** on homogeneous function of two variables.

(iii) If $y = \sin\left(m\sin^{-1} x\right)$, prove that $(1-x^2)y_{n+2} - (2x+1)xy_{n+1} + (m^2 - n^2)y_n = 0$

(iv) If $u = \sin^{-1}\frac{x^2+y^2}{x+y}$ prove that $x\frac{du}{dx} + y\frac{du}{dy} = \tan u$

(v) A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports ?

Semester-I, 2nd Internal Test (GE), 2019

Programme- B.Sc./B.A.(Voc.) in Computer Application

B. N. College, Patna University, Patna

Full Marks: 7.5 Marks | Mathematics | Duration: 45 min.

Group A : Multiple Choice Question – Answer All Questions (5 x 0.5 = 2.5)

1. (i) Scalar matrices have
   (a) All elements Zero (b) diagonal elements Zero
   (c) All elements Zero except diagonal elements (d) None of these

(ii) The product of two matrices A and B i.e. AB is defined only if
   (a) Number of Rows of A= Number of Column of B
   (b)Number of Columns of A= Number of Rows of B
   (c)A and be are have equal elements
   (d) None of these

(iii) A matrix A is said to be Transpose if
   (a) $A = A'$ (b) $A = A''$ (c) $A = (A')'$ (d) None of these

(iv) If $y = \log x$ then y_2
   (a) $\frac{\pi}{2}$ (b) $\frac{1}{x}$ (c) 0 (d) None of the

(v) Which of the following is not a set?

   a) The collection of all boys in B. N. College Patna.
   b) The collection of all even integers.
   c) The collection of ten most talented writers of India.
   d) The collection of all natural numbers less than hundred

Group B : Short Type Question – Answer Any Two Question (2 x 1.5 = 3.0)

(2) (i) If $A=\begin{bmatrix}1 & 2 & 3\\ 0 & 1 & 2\\ 0 & 0 & 1\end{bmatrix}$, $B=\begin{bmatrix}x\\ y\\ z\end{bmatrix}$, and $AB=\begin{bmatrix}6\\ 3\\ 1\end{bmatrix}$, find the value of x, y and z.

(ii) If $A=\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\end{bmatrix}$ and $B=\begin{bmatrix}7 & 8\\ 9 & 10\\ 11 & 12\end{bmatrix}$ the find AB

(iii) If if $y = x^n$ find y_n.

(iv) If A={1, 2} and B={1,2,3} . Find A X B

Group C : Long Type Question – Answer Any One Question (2 marks each): **(1 x 2.0 = 3.0)**

3. Find the inverse of the Matrix.

$$\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 6 & 7 & 9\end{bmatrix}$$

4. Solve by matrix method $x + y + z = 1$, $x + 2y + z = 2$ and $x + y + 2z = 0$

5. State and prove **Euler's theorem** on homogeneous function of two variables.