Printed Page: **NAS103**

(Following Paper ID and Numbers to be filled in your Answer book)

Paper ID: 1 9 9 1 2 5 Roll No.:

B.TECH

(SEM. I) (ODD SEM) THEORY EXAMINATION, 2015-16

ENGINEERING MATHEMATICS-I

Time: 3 Hours **[Total Marks: 100]**

Section-A

Q.1 Attempt all parts. All parts carry **equal** marks. Write answer of each part in short. **(2x10 = 20)**

(a) Find the derivative of y =x2. Sin x at x =0.

(b) If x^2 = au + bv, y^2 = au – bv, then find — —

(c) If x = u (1 + v), y = v (1 + u, find ———

(d) What is the maximum values of function f = 1 – x^2 y^2?

(e) For what value of 'K' the rank of matrix

(f) The Eigen values of A are 2,3,1 then find the Eigen values of

(g) Evaluate

(h) Find the value of –.

(i) Find the unit normal at the surface at the point

(j) If is the position vector, the value of

Section- B

Note: Attempt any **five** questions from this section. **(10x5 = 50)**

Q.2 If m $\sin^{-1} x = \sin^{-1}$ y, Find the value of yn at x = 0.

Q.3 If *u, v, w* are the roots of the equation $(x – a)^3 +(x –b)^3 +(x –c)^3= (x – c)^3 = 0$, then find ———

Q.4 The angles of a triangle are calculated from the sides If small change are made in sides. Show that approximately — where is the area of triangle and A,B,C are the angles apposite to a,b,c respectively, verify that .

Q.5 Find the Eigen values and corresponding Eigen vectors of .

Q.6 Verify Cayley-Hamilton theorem for ,

Hence evaluate + .

Q.7 Show that ——— – — the integral being taken through the volume bounded by planes

.

Q.8 Change the order of Integration in — and hence evaluate the same.

Q.9 Verify the Green's theorem to evaluate the line integral where C is the boundary of the closed region bounded by

Section- C

Note: Attempt any **two** questions from this section. **(15x2 = 30)**

Q.10 (i) Find the derivative of hence prove that $=$

(ii) Find the value of so that the equation satisfies the relation

— — —— — —

(iii) Verify Euler's theorem for the function − −

Q.11 (i) If

(ii) Investigate the values of λ and μ so that equation

,

have (i) no solution (ii) a unique solution (iii) infinite solution.

(iii) Evaluate the area enclosed between and the straight line

Q.12 (i) Show that . Hence show that −

(ii) Show that the vector field — where is irrigational. Find the scalar potential.

(iii) If evaluate arround the curve C consisting of .