

INDIAN MARITIME UNIVERSITY
(A Central University, Govt. of India)
May/June 2018 End Semester Examinations
DNS (Diploma in Nautical Science)
Semester I
Applied Mathematics (UD11T1101)

Date:04.06.2018

Max. Marks: 70

Time: 2 Hrs

Pass Marks: 25

(Attempt any five questions, use of calculator is allowed.)

Marks: 5 x 14 =70

1. a. Find the constant so that the 2 vectors $a = \hat{i} + (2\lambda - 1)\hat{j} + 3\hat{k}$ and $b = -3\hat{i} + 2\hat{j} - \lambda\hat{k}$ are perpendicular.
- b. If $a = \hat{i} + 2\hat{j} - 3\hat{k}$, $b = 3\hat{i} - \hat{j} + 2\hat{k}$. Calculate the angle between $2\bar{a} + \bar{b}$ and $\bar{a} + 2\bar{b}$

(7+7 marks)

2. a. The ranking of 10 students in two subjects A and B are as follows.

A :	3	5	8	4	7	10	2	1	6	9
B:	6	4	9	8	1	2	3	10	5	7

What is the coefficient of the rank correlation?

- b. What is the chance of drawing a total of 3 or 5 or 11 with two dice?

(7+7 marks)

3. a. Find $\frac{d^2y}{dx^2}$, if $x = a \cos \theta$, $y = b \sin \theta$

b. If $y = ae^{x+} be^{-x}$ Prove $\frac{d^2y}{dx^2} - y = 0$

(7+7 marks)

4. a. Evaluate: $\int x^2 \log x dx$

b. Evaluate : $\int \tan^{-1} x dx$

(7+7 marks)

5. a. Obtain the equation of a circle which passes through the intersection of liens $3x - 2y - 1 = 0$, $4x + y - 27 = 0$ and whose centre is the point $(2, -3)$

b. Find the equation of the hyperbola, the length of whose latus rectum is 8 and eccentricity is $\frac{3}{\sqrt{5}}$

(7+7 marks)

6. a. In a right angled spherical triangle RST side $t = 80^\circ 32'$, side $r = 60^\circ 40'$ and angle $T = 90^\circ$. Calculate angle S .

b. In spherical triangle ABC angle $A = 60^\circ$ and sides $b = c = 66^\circ 12'$. Calculate angle B .

(7+7 marks)
