00640

B.Sc. (NAUTICAL SCIENCE)

Term-End Examination

June, 2013

BNA-011 : APPLIED MATHEMATICS

Time : 2 hours *Maximum Marks : 70*

Note : *(i) Attempt **any five** questions.*

*(ii) Use of scientific calculator is **allowed**.*

1. (a) Find $\int_1^{11} f(x)\,dx$, where $f(x)$ is given by the following table, using Simpson's one - third rule. 7

x :	1	2	3	4	5	6	7	8	9	10	11
$f(x)$:	543	512	501	489	453	400	352	310	250	172	95

(b) Find the angle between two vectors $\vec{a}$ and $\vec{b}$ having the same length $\sqrt{2}$ and their scalar product is -1. 7

2. (a) A die is thrown 6 times. If "getting an odd number" is a "success", what is the probability of getting : 7

(i) 5 successes

(ii) at least 5 successes

(b) For 10 observations on price (x) and supply (y), the following data were obtained (inappropriate units) : 7

$\Sigma x = 130$, $\Sigma y = 220$, $\Sigma x^2 = 2288$, $\Sigma y^2 = 5506$ and $\Sigma xy = 3467$. Obtain the y on x line of regression.

3. (a) If $y = 3\cos(\log x) + 4\sin(\log x)$ 7

Show that $x^2 y_2 + x y_1 + y = 0$.

(b) If $x = a(\cos t + t \sin t)$ and $y = (\sin t - t \cos t)$ 7

find $\frac{d^2 y}{dx^2}$.

4. (a) Evaluate $\int \sqrt{7x - 10 - x^2}\, dx$. 7

(b) Using Integration, find the area of the region bounded between the line $x = 4$ and the parabola $y^2 = 16x$. 7

5. (a) In a spherical triangle ABC, angle $A = 124° 21'$, side $AB = 41° 30'$ and side $AC = 51° 30'$; Calculate side BC using Haversine formula. 7

(b) In a quadrantal spherical triangle ABC side $b = 90°$, angle A and B are $65° 30'$ and $75° 15'$ respectively. Calculate side c and angle C. 7

6. (a) Find the equation of the circle passing through the point (2, 4) and centre at the intersection of the lines $x - y = 4$ and $2x + 3y = -7$. 7

(b) Find the equation of the ellipse if $e = \frac{3}{4}$, foci on y - axis, centre at origin and passing through (6, 4). 7