



DEPARTMENT OF MATHEMATICS/ICT

EDO UNIVERSITY, IYAMHO

SECOND SEMESTER EXAMINATION 2015/2106

instruction: Answer any five(5) questions

Time allowed: 2 hr. 30 mins

MTH 123- VECTORS, CO-ORDINATE GEOMETRY AND STATISTICS

- (1) a. If position vectors, \mathbf{OA} , \mathbf{OB} , \mathbf{OC} , are defined by $\mathbf{OA} = z\mathbf{i} - \mathbf{j} + 3\mathbf{k}$, $\mathbf{OB} = 3\mathbf{i} + z\mathbf{j} - 4\mathbf{k}$, $\mathbf{OC} = -\mathbf{i} + 3\mathbf{j} - z\mathbf{k}$, determine the :
- (i) **Vector AB**
 - (ii) **Vector BC**
 - (iii) **Vector product $\mathbf{AB} \times \mathbf{BC}$**
- b. Find the moment and the magnitude of the moment of a force of $(\mathbf{i} + 2\mathbf{j} - 3\mathbf{k})$ newtons about point B having co-ordinates $(0, 1, 1)$, when the force acts on a line through A whose co-ordinates are $(1, 3, 4)$.
- (2) a. Show that $\mathbf{A}(-1,-3)$, $\mathbf{B}(6,1)$ and $\mathbf{C}(2,5)$ form a right angle triangle.
- b Find x if the distance between $\mathbf{A}(2,1)$ and $\mathbf{B}(x,7)$ is 10.
- c. Find the mid point co-ordinate of the line joining the point $\mathbf{P}(-3,3)$ and $\mathbf{Q}(1,0)$.
- (3) a. Find an equation of the line containing the point $(4,4)$ and **Parallel** to the line
- $$2x + 3y = -6$$
- b. Write a function that describe the line containing the point $(4,6)$ and is **Perpendicular** to the line $3x + 4y = 8$.





c. Find the angle between the lines $2x - y = 1$ and $4x + 2y = 5$.

(4) a. If $x^2 + y^2 - 4x - 8y + 5 = 0$ is the equation of a circle. Find the centre and its radius.

b. Determine an equation of the circle with centre at $(-4,6)$ and pass through $(-1,2)$.

c. Find the point of intersection of $2x + 5y + 11 = 0$ which is tangent to the circle $x^2 + y^2 + 2x - 8y - 12 = 0$

(5) a. Obtain the equation of a circle via the points $A(2,3)$, $B(6,3)$ and $C(4,-1)$.

b. Find the equation of the tangent at the point $(3,1)$ on the circle $x^2 + y^2 + 4x - 10y - 12 = 0$

(6) a. Find the equation of the tangent and Normal to the parabola $y^2 + 6y - 8x + 7 = 0$ from point $(1,-2)$

b.i. What is Statistics

ii. Write out methods of collecting data that you know.

c. The mean of $1, 2, x, 11, y, 14$ is 8 , and the median is 9 . Find the value of x and y .

(7) a. Differentiate between discrete and continuous variables.

b.

Marks	0-9	10-19	20-29	30-39	40-49
No of Students	10	27	19	6	2

The table above shows the marks obtained by 64 students in a text . Calculate correct to 2 decimal places the mean mark and modal mark.

