

## Quiz 4.

1. Find the first three terms if  $n^{\text{th}}$  term is

$$a_n = 3a_{n-1} + 2 \quad (1)$$

2. (i) Find the sum of the series

$$1 + 2 + 3 + \dots + n \quad (1)$$

(ii)  $2 + 4 + 6 + 8 + \dots + 20 \quad (1)$

3. If  $2 + 4 + 8 + 16 + 32$  is given

(i) Identify what type of a series is this (1)

(ii) Find the sum of the series (1)

(1) Evaluate the Determinants

$$\begin{vmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{vmatrix}$$

(2)

$$\begin{vmatrix} x^2 - x + 1 & x - 1 \\ x & -x \end{vmatrix}$$

(3) Find the value of  $x$  for which

$$A = \begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix}, \quad B = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$$

$$+ \quad A = B$$

(4) Find the Adjoint  $A$  if

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$$

dt 18/11/2007

## Quiz II

- Q1. Find the increments  $\Delta x$  and  $\Delta y$  given  $P_1(2, 5)$  and  $P_2(3, 2)$  (1)
- Q2. Write the equation passing through two points  $(-2, 1)$ ,  $(2, -2)$  (1)
- Q3. Find the distance between points given in question 2 and also the slope between the points. (2)
- Q4. Write the equation of a line through  $(\frac{1}{3}, 4)$  and no slope. (1)

12/11/07

Remedial Maths  
Quiz I

dt 7.11.2007

Marks 5

Solve

Q1.  $\int (x^3 - \frac{1}{x^3}) dx$

Marks

(1)

Q2.  $\int (\sin x - \cos x)^2 dx$

(1)

Q3.  $\int \left( \frac{1 + \cos 2t}{2} \right) dt$

(1)

Q4.  $\int_1^{p^2} \sec 2t \tan 2t dt$

(2)

**BITS, PILANI – DUBAI**  
**Dubai International Academic City, Dubai, UAE**

**1<sup>st</sup> Semester 2007 – 2008**  
**Test-II (open book)**

1<sup>st</sup> year – Section 6  
9<sup>th</sup> December 2007

Course: Remedial Mathematics (MATH D021)  
Marks: 20 , Weightage 20%

Note: 1. Answer all Questions.  
2. All parts of the question should be done together

**Q1.a)** Find the Integral of the following functions [1]

$$\int (x + x^2) dx$$

b) Find the value of the following Integral

$$\int_0^{\frac{\pi}{4}} \sin t dt$$
 [1]

**Q2.a)** Solve the Integral

$$\int_{-2}^0 \frac{2x + 4}{x^2 + 4x + 5} dx$$
 [2]

b) Find the integral of the following function

$$\int z e^z dz$$
 [2]

c) Integrate

$$\int (\sin x + \cos x)^2 dx$$
 [2]

**Q3. a).** Find the Integral of the following functions

$$\int (1 + x^2)^3 dx$$
 [2]

b) Complete the square and Integrate the following

$$\int \frac{dx}{\sqrt{x^2 - 6x}}$$
 [2]

c) Integrate

$$\int \frac{(2x + 3) dx}{(x + 1)^2}$$
 [2]

**Q4.a)**

[1]

$$\text{If } A = \begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$$

Write the matrix A as a sum of symmetric and skew symmetric matrix

b)  $A = \begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 4 \\ 3 & 6 \end{bmatrix}$  Find the product AB

[2]

c) Find the inverse of matrix B using elementary row transformations

[3]

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

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**1<sup>st</sup> Semester 2007 – 2008**  
**Test-1 (closed book)**

1<sup>st</sup> year – Section 6  
Sunday 28<sup>th</sup> October 2007 8.30 to 9.20am

Course: Remedial Mathematics (MATH D021)  
Marks: 25 Weightage 25%

Note: 1. Answer all Questions.  
2. All parts of the question should be done together

**Q1. a).** Find the derivative of the following functions

$$y = \sqrt{x} \quad [2]$$

**b)** Find the value of the derivative at the point given

$$g(t) = \frac{1}{t^2}, \quad g'(2), g'(\sqrt{3}) \quad [3]$$

**Q2.a)** Use the second derivative test to find the extreme value also find whether the point is a point of local maxima or minima.

$$y = 6 - 2x - x^2 \quad [3]$$

**b)** Find the interval on which the following function is increasing or decreasing given

$$g(t) = -t^2 - 3t + 3 \quad [2]$$

**Q3.a)** Find value of c which satisfies the mean value theorem

$$h(x) = x^2 + 2x - 1, \quad [0, 1] \quad [1]$$

**b)** If a ball bearing is released from rest at time  $t=0$ sec

– How many meters does the ball fall in the first 2 seconds if the free fall equation is given by  $s = 4.9t^2$  [2]

– What is the velocity, speed and acceleration then?

**c)** Find  $\frac{dy}{dx}$  for the function  $x^2y + xy^2$  [2]

*and write*  
**Q4. a)** Sketch the unit vector  $\bar{u} = \cos \theta \hat{i} + \sin \theta \hat{j}$  for  $\theta = \frac{-\pi}{4}$  [2]

**b)** Find the unit tangent and normal to the curve at the given point

$$3x^2 + 8xy + 2y^2 - 3 = 0, \quad (1, 0) \quad [3]$$

**Q5. a)** Find the unit vector in the direction of vector from  $P_1(1,0,1)$  to  $P_2(1,0,0)$  also find the distance between the points [1]

**b)** Find the dot product of

$$\bar{A} = 3 \hat{i} \text{ and } \bar{B} = \sqrt{2} \hat{i} + \sqrt{2} \hat{k} \quad [2]$$

**c)** Find the volume of the box determined

$$\bar{A} = \hat{i} + 2\hat{j} - \hat{k} \text{ and } \bar{B} = -2\hat{i} + 3\hat{k} \text{ and } \bar{C} = 7\hat{j} - 4\hat{k} \quad [2]$$