UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BIT

UCSC

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2014/2015 – 2nd Year Examination – Semester 3

IT3305: Mathematics for Computing-II
PART 2 - Structured Question Paper
15th March 2015
(ONE HOUR)

To be completed by the candidate

BIT Examination Index No:

Questions Answered

Indicate by a cross (✗), (e.g. ✗) the numbers of the questions answered.

To be completed by the candidate by marking a cross (✗).	1	2	3	
To be completed by the examiners:				

1)

(a) Consider three matrices, $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 0 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix}$.

Verify that by evaluating both the matrix expressions separately

(10 marks)

(b)

    (i).   Define the inverse of a matrix.

(05 marks)

ANSWER IN THIS BOX

    (ii).   Let $A = \dfrac{1}{3}\begin{pmatrix} 2 & -2 & 1 \\ 1 & 2 & 2 \\ 2 & 1 & -2 \end{pmatrix}$.

        (I)   Show that the product of the two matrices A and A^{T}, is commutative.

(05 marks)

ANSWER IN THIS BOX

(II)   Find A⁻¹.

ANSWER IN THIS BOX

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(c) Consider the following system of linear equations.

$$2x + y - z = 3$$
$$x + 3y + 2z = -1$$
$$2x + 2y + z = 2$$

Solve the above equations using matrix operations.

(15 marks)

ANSWER IN THIS BOX

2) (a) To which value does the sequence $x_n = \frac{2n-1}{2n+1}$ converge, as n tends to infinity? Justify your answer.

(10 marks)

ANSWER IN THIS BOX

(b) If $\sin x \approx x - \frac{x^3}{6} + \frac{x^5}{120} - \frac{x^7}{5040}$, find an approximate expansion for $\cos x$.

(10 marks)

ANSWER IN THIS BOX

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(c) Find the area in the first quadrant bounded by the x-axis, y-axis and the curve
$y = 4 - x^2$.

(10 marks)

ANSWER IN THIS BOX

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3)

The number of emails received per day by a first year undergraduate student in a certain university is a discrete random variable with the following probability distribution function.

X	0	1	2	3	4	5	6	7	More than 7
Probability	a	2a	0.15	0.10	a	0.15	0.10	b	0

(a) It is given that the probability of X is less than or equals 2, is 0.3. Calculate the values of *a* and *b*.

(05 marks)

ANSWER IN THIS BOX

For a particular day, calculate the following for questions (b) to (f).

(b) Calculate the probability of getting at least one email.

(05 marks)

ANSWER IN THIS BOX

(c) Calculate the probability of getting at most 3 emails.

(05 marks)

ANSWER IN THIS BOX

(d) Calculate the probability of getting more than 4 emails.

(05 marks)

ANSWER IN THIS BOX

(e) Calculate the probability of getting between 2 and 5 exclusive emails.

(05 marks)

ANSWER IN THIS BOX

(f) Calculatethe expected number of emails.

(05 marks)

ANSWER IN THIS BOX

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