UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

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

IT3305: Mathematics for Computing-II

PART I – Multiple Choice Question Paper
27th February 2015
(ONE HOUR)

Important Instructions :

- The duration of the paper is **1(one) hour**.
- The medium of instruction and questions is English.
- The paper has 25**questions**and **5pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1) Which of the following is/are true about an Identity matrix I?

(a) It is a symmetric matrix.
(b) All elements along the diagonal are equal to zero.
(c) It is an upper triangular matrix.
(d) It is a lower triangular matrix.
(e) The number of rows of the matrix equals the number of columns.

2) Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 & 6 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$. Then $|B|$ is equal to

(a) $2|A|$ (b) $\frac{1}{2}|A|$ (c) $8|A|$
(d) $\frac{1}{8}|A|$ (e) $2|B|$

3) Let A and B be two square matrices of the same order. Which of the following is/are equal to $(BA)^{T})^{-1}$?

(a) $(B^{T}A^{T})^{-1}$ (b) $(A^{T})^{-1}(B^{T})^{-1}$ (c) $(B^{T})^{-1}(A^{T})^{-1}$
(d) $(A^{T}B^{T})^{-1}$ (e) $((BA)^{-1})^{T}$

4) Let A=$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and let C denote its matrix of cofactors. Find C.

(a) $\begin{bmatrix} -1 & 6 \\ 6 & -16 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -6 \\ -6 & 16 \end{bmatrix}$ (c) $\begin{bmatrix} 4 & -3 \\ -2 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} -4 & 3 \\ 2 & -1 \end{bmatrix}$ (e) $\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

5) Which of the following is/are not invertible?

(a) $\begin{bmatrix} -1 & 3 \\ 2 & 6 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & -6 \\ -1 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 4 & 2 \\ 2 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} -4 & 3 \\ 2 & -1 \end{bmatrix}$ (e) $\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

6) If A is a non-singular matrix, which of the following formulae gives A^{-1}?

(a) $\frac{1}{|A|}(adj\ A)^{T}$ (b) $|A|\ (adj\ A)^{T}$ (c) $\frac{1}{|A|}\ adj\ A$ (d) $|A|adjA$ (e) $\frac{1}{|adj\ A|}$

7) Which of the following is/are always true about a homogeneous system of linear equations?

(a) It is **consistent.**
(b) It is**inconsistent.**
(c) It has an**unique** solution.
(d) It has **infinitely many** solutions.
(e) It has **no** solution.

8) Which of the following is an/are **not**an elementary row operation(s) on the relevant matrix in solving a system of linear equations?

(a) Interchanging two rows of the matrix
(b) Multiplying a row by any constant
(c) Multiplying a row by a non-zero constant
(d) Dividing a row by a non-zero constant
(e) Adding a multiple of one row to another row

9) Which of the following is/are true for a non-zero vector $\underline{a}$?

(a) $\underline{a}.\underline{a} = 0$ (b) $\underline{a}.\underline{a} \neq 0$ (c) $|\underline{a}|\underline{a}$ is a vector.
(d) $\underline{a}.\underline{a} = 1$ (e) $|\underline{a}|\underline{a}$ is a scalar.

10) If $\underline{x} = 2a\underline{i} + 3a\underline{j} - \sqrt{3}a\underline{k}$ is a unit vector, then the value of $a$could be

(a) $\frac{1}{4}$. (b) $-\frac{1}{4}$. (c) $\frac{1}{2}$.
(d) $-\frac{1}{2}$. (e) $\frac{1}{8}$.

11) If $\overrightarrow{AB} = \overrightarrow{DC}$ then ,

(a) ABCD is a parallelogram. (b) $|\overrightarrow{AB}| = |\overrightarrow{DC}|$. (c) $\overrightarrow{AB}.\overrightarrow{DC} = 0$.
(d) AB is parallel to DC. (e) AB is perpendicular to DC.

12) If $\overrightarrow{AB} = 3\overrightarrow{BC}$ then

(a) A, B and C are collinear. (b) AB is perpendicular to BC. (c) $\overrightarrow{AB}.\overrightarrow{BC} = 0$.
(d) AB is parallel to BC. (e) A,B and C are not collinear.

13) If $I_n = nI_{n-1}$ for $n = 1,2,3,...$ and $I_0 = 1$, then I_3 is equal to

(a) 12 .	(b) 6 .	(c) 4 .
(d) 2 .	(e) 10 .	

14) The general term of the sequence 2, 6, 12, 20, 30, … could be

(a) n(n-1).	(b) n^2.	(c) 3n.
(d) n(n+1).	(e) 2n+2.	

15) The sum 1+2+3+4+….+1,000 is equal to

(a) 505,000.	(b) 500,500.	(c) 550,000.
(d) 500,050.	(e) 500,005.	

16) Let $T_n = 1 + (-1)^n$, $n = 1,2,3,....$ Then $T_{50} + T_{51}$ is equal to

(a) 0.	(b) 1.	(c) -1.
(d) 2.	(e) -2.	

17) $\int_1^2 2^x \, dx$ is equal to

(a) $\frac{3}{\ln 2}$.	(b) $3\ln 2$.	(c) $2\ln 2$.
(d) $\frac{2}{\ln 2}$.	(e) $\frac{6}{\ln 2}$.	

18) $\int_0^1 \frac{1}{\sqrt{x+1}} dx$ is equal to

(a) $2(\sqrt{2}-1)$.	(b) $\sqrt{2}(\sqrt{2}-1)$.	(c) $2\sqrt{2}$.
(d) 4.	(e) $4-\sqrt{2}$.	

19) If $f(x) = \sqrt{x+1}$, then $f(x)f'(x)$ is equal to

(a) $\frac{1}{2}$.	(b) 1.	(c)x+1.
(d)2.	(e) $\frac{1}{x+1}$.	

20) If $f(x)=\cos x+\sin x$, then $f(x)+f''(x)$ is equal to

(a) $2\cos x$.	(b) $2\sin x$.	(c) $\cos x-\sin x$.
(d) $2(\cos x+\sin x)$.	(e) 0.	

21) Which of the following is a/are continuous random variable/s?

(a) BIT registration number
(b) Island rank of a student at the G.C.E. (A/L) examination
(c) Average mark of semester 6 exam papers
(d) Number of femalestudents taller than 68 inches
(e) Time taken to downloadan MP3 file

22) A random variable follows a binomial distribution with n=10 and p=0.2. What is the variance of this distribution?

(a) 0.16	(b) 0.40	(c) 1.60
(d) 2.00	(e) 4.00	

23) If the mean of a Poisson distribution is 3 then the standard deviation is

(a) 1.50.	(b) 1.73.	(c) 3.00.
(d) 6.00.	(e) 9.00.	

24) Suppose that a random variable X follows a binomial distribution with n=8 and p=0.2. What is the probability that X=3?

(a) ${}^8C_3(0.2)^3(0.2)^5$	(b) ${}^8C_3(0.2)^3(0.8)^5$	(c) ${}^8C_3(0.2)^5(0.8)^3$
(d) ${}^3C_8(0.2)^3(0.8)^5$	(e) ${}^3C_8(0.2)^5(0.8)^3$	

25) Suppose that a random variable Y follows a Poisson distribution with parameter 2. What is the probability that Y=3?

(a) $\frac{e^{-2}2^3}{3!}$	(b) $\frac{e^{-3}3^2}{2!}$	(c) $\frac{e^{-3}2^3}{2!}$
(d) $\frac{e^{-2}3^2}{2!}$	(e) $\frac{e^{-3}3^2}{3!}$	

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