UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2020 – 1st Year Examination – Semester 1

EN1106 – Introductory Mathematics
Multiple Choice Question Paper

(ONE HOUR)

<u>**Important Instructions :**</u>

- The duration of the paper is **1 (one) hour**.

- The medium of instruction and questions is English.

- The paper has **25 questions** and **6 pages**.

- All questions are of the **MCQ** (Multiple Choice Questions) type.

- All questions should be answered.

- Each question will have 5 (five) choices with <u>**one or more**</u> 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.**

- Calculators are **not** allowed

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1) The positive solution of the quadratic equation $x^2 - x - 1 = 0$ to two significant figures is

(a) 1.6   (b) 1.7   (c) 1.2
(d) 1.8   (e) 1.9

2) The expression $x + \dfrac{1}{x - \dfrac{1}{x}}$ is equivalent to

(a) $\dfrac{x^2}{x^3 - 1}$ (b) $\dfrac{x^3 - 2x}{x^2 - 1}$ (c) $\dfrac{x^3 + 2x}{x^2 - 1}$

(d) $\dfrac{x^3}{x^2 - 1}$ (e) $\dfrac{x^2}{x^2 - 1}$

3) The greatest common divisor (gcd) of 14 and 91 is

(a) 2   (b) 91   (c) 7
(d) 14   (e) 82

4) The value of $\log_{10}\left[\log_2 8 - \log_4 16\right]$ is

(a) 0   (b) 1   (c) 2
(d) 10   (e) ½

5) Two cars A and B which are 100km apart move towards each other on a straight road. A moves at 50kmph and B at 100kmph. If B starts moving 1 hour after A then the distance moved by A when they meet is

(a) 100 km   (b) 200/3 km   (c) 50 km
(d) 220/3 km   (e) 250/3 km

6) The solution to the equation $8^{x-1} \times 2^{4x-11} = 4^7$ is

(a) 3   (b) 4   (c) 6
(d) 5   (e) 7

7)

Currently, the price of a pair of socks is Rs 250, while the price of a scarf is Rs 350. The price of a pair of socks rises by 5%, whereas the price of a scarf drops by 10%. What is the change in cost for a consumer who buys one pair of socks and one scarf?

(a) A total cost reduction of 3.75%

(b) An increase of 2% in total cost

(c) No change in total cost

(d) A reduction of 5% in total cost

(e) A total cost reduction of Rs 22.5

8)

Mary bought items X and Y for Rs. 200 and Rs. 225 respectively. She sold X for Rs. 250 and Y for Rs. 275. Then, which of the following is true?

(a) Percentage profit of Y is less than the percentage profit of X.

(b) Percentage profit of Y is more than the percentage profit of X.

(c) Both items give the same percentage profit.

(d) X gives a 25% profit.

(e) The percentage profits are not comparable.

9)

A cylinder of radius 5 cm holds water to a height of 10 cm. This cylinder is emptied by pouring all the water into a right circular conical vessel of radius 10 cm. Then the height of water in the conical vessel will be

(a) 7.5 cm   (b) 5.5 cm4   (c) 12.5 cm

(d) 10 cm   (e) 6.5 cm

10)

The remainder when 3^{212} is divided by 43 is

(a) 9   (b) 5   (c) 6

(d) 7   (e) 8

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11) The inverse of 17 modulo 23 is

(a) 9   (b) 15   (c) 16

(d) 13   (e) 19

12) ABCD is a rhombus of side 10 cm whose diagonals are in the ratio 1:2. Then the smaller diagonal is of length

(a) $2\sqrt{5}$ (b) $4\sqrt{5}$ (c) $8\sqrt{5}$

(d) $\sqrt{5}$ (e) $\sqrt{5}/2$

13) If $\tan x = k$ then $\sin^2 x \cos^2 x$ is equal to

(a) $\left(\dfrac{k}{1+k^2}\right)^2$ (b) $\dfrac{k^2}{1+k^2}$ (c) $k^2(1+k^2)$

(d) $\left(\dfrac{1+k^2}{k}\right)^2$ (e) $\dfrac{1}{k^2(1+k^2)}$

14) If $N = 4\left(a + \dfrac{c}{3}\right)^{1/3}$ then c is equal to

(a) $c = 3\left(\dfrac{N^3}{64} - a^3\right)$ (b) $c = 3\left(\dfrac{N^3}{4} - a^3\right)$ (c) $c = 3\left(\dfrac{N}{4} - a^3\right)$

(d) $c = 3\left(\dfrac{N^3}{64} - a\right)$ (e) $c = 3\left(\dfrac{N^3}{4} - a\right)$

15) Two similar closed water tanks have their areas in the ratio 4:9. Then their capacities are in the ratio

(a) 4:9   (b) 8:27   (c) 4:27

(d) 2:9   (e) 64:729

16) Rs X invested at compound interest of 10% per annum for 3 years yields the same amount when it is invested at simple interest of r % for 4 years. Then the value of r to 2 significant figures is

(a) $r = 11$	(b) $r = 10$	(c) $r = 8.3$
(d) $r = 9.1$	(e) $r = 8.7$	

17) If the first, fourth and tenth terms of an arithmetic progression are the first, second and third terms of a geometric progression respectively, then the common ratio of the geometric progression is

(a) 3	(b) 2	(c) 4
(d) 0	(e) -2	

18) If the sum of the first n terms of a sequence is $S_n = (n+1)\left(n+\dfrac{1}{2}\right)$ then the sixth term is

(a) 10	(b) 20	(c) 35/2
(d) 15	(e) 25/2	

19) The sum $S = 1 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} + \cdots \dfrac{1}{n} + \cdots$

(a) is finite but small	(b) is infinite	(c) $S < 100$
(d) $S > 100{,}000$	(e) $10 < S < 100$	

20) Given that $\dfrac{\left(36x^4\right)^2}{8x^2 \times 3x} = 2^a \times 3^b \times x^c$ then the triad (a,b,c) is equal to

(a) (3,1,5)	(b) (2,3,5)	(c) (3,2,5)
(d) (1,3,5)	(e) (5,3,1)	

21) The solution to the equation $\log_5 (2 - 3x) = 3$ is

(a) -241/3	(b) 241/3	(c) 41
(d) -41	(e) -13/3	

22) If $x^2 - 6x + 4 > -4$ then

(a) $x < 2$ and $x > 4$ (b) $x < 4$ (c) $x < -2$ and $x > 4$

(d) $x > 2$ (e) $x < 2$ or $x > 4$

23) If the sum of infinite terms of a geometric series is 5, then the first term a of the series must satisfy

(a) $a \geq 0$ (b) $0 \leq a < 10$ (c) $0 < a < 10$

(d) $0 < a \leq 10$ (e) $0 \leq a \leq 10$

24) If $\left|x^2 - 4x - 1\right| = 4$, where $x > 0$, then the values of x are

(a) 1, 2, 3 and 5 (b) 1 and 3 (c) 3 and 5

(d) 1, 3 and 5 (e) 2 and 3

25) If the two shorter sides of a right-angled triangle are $3 + \sqrt{2}$ and $1 + 2\sqrt{2}$, then the area of the triangle is

(a) $7\left(1 + \dfrac{1}{\sqrt{2}}\right)$ (b) $\dfrac{7 + \sqrt{2}}{2}$ (c) $\dfrac{7 + 2\sqrt{2}}{2}$

(d) $\dfrac{7}{2}\left(1 + \sqrt{2}\right)$ (e) $\dfrac{7}{2}\left(3 + \sqrt{2}\right)$

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