UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2021 – 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 **06 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) If the perimeter of a rectangle is 160 cm and its length is 50 cm, then its diagonal is

(a) 50 cm	(b) $10\sqrt{34}$ cm	(c) 40 cm
(d) $10\sqrt{41}$ cm	(e) 30 cm	

2) If $x = 5$ then $x + \dfrac{1}{1+\frac{1}{x}}$ is equal to

(a) 31/6	(b) 37/6	(c) 35/6
(d) 33/6	(e) 29/6	

3) How many prime numbers are there between 100 and 120?

(a) 8	(b) 7	(c) 6
(d) 5	(e) 4	

4) The solution to the following set of simultaneous equations is

$$\frac{1}{x} + \frac{1}{y} = 5 \quad \text{and} \quad \frac{1}{x} - \frac{1}{y} = 1$$

(a) $x = 3, \ y = 2$	(b) $x = 1/3, \ y = 1/2$	(c) $x = 2, \ y = 3$
(d) $x = 1/2, \ y = 1/3$	(e) $x = 1/3, \ y = -1/2$	

5) Two cars A and B which are 100km apart move in the same direction where A is in front of B and, B starts 30 minutes after A. If A moving at 50kmph and B at 100kmph, how long will it take for B to overtake A?

(a) 2 hours	(b) 2 hours and 15 minutes	(c) 3 hours
(d) 2 hours and 20 minutes	(e) 2 hours and 30 minutes	

6) Which of the following lines are parallel to the line $2x + 3y - 7 = 0$.

(a) $4x + 8y - 7 = 0$	(b) $4x + 6y - 15 = 0$	(c) $2x + 4y - 4 = 0$
(d) $2x + 3y - 6 = 0$	(e) $4x - 6y - 6 = 0$	

7) One of the roots of the equation $x^3 - 2x^2 - 5x + 6 = 0$ is 1. Then the other roots are

(a) 2 and 3

(b) -2 and -3

(c) -2 and -1

(d) -1 and -3

(e) -2 and 3

8) The expression $1 + \dfrac{1}{1 - \frac{2}{1-x^2}}$ is equal to

(a) $\dfrac{2x^2}{1-x^2}$

(b) $\dfrac{2x^2}{1+x^2}$

(c) $\dfrac{2x^2}{2+x^2}$

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

(e) $\dfrac{2x}{1+x^2}$

9) If $x^2 + 2x + 5 > 0$, then the possible values of x are

(a) $x > 1$

(b) $x > 0$

(c) Any real number

(d) $-1 < x < 5$

(e) $-5 < x < 1$

10) A solid metal cube of side k cm is melted and a cone of base radius k/2 cm is made. The height of this cone in cm is

(a) $6k/\pi$

(b) $3k/\pi$

(c) $9k/\pi$

(d) $24k/\pi$

(e) $12k/\pi$

11) The sum of squares of two numbers x and y is 2, and their product is 1. Then the square of the sum of x and y is

(a) 4

(b) 3

(c) 6

(d) 2

(e) 8

12) If $x_{n+1} = 2x_n$ for $n \geq 1$ and $x_1 = 10$, then the value of x_{10} is

(a) 10×2^{10}

(b) 10×2^9

(c) 2560

(d) 5120

(e) 10×2^8

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13) If $|4x - 1| > 3$, then x will satisfy

(a) x > 1

(b) x > 2

(c) x < 1

(d) x < -2

(e) x < -1/2

14) A spherical bowl of diameter 20 cm is full of water. This is emptied by pouring the water into a cuboid shaped vessel with a square base of side 10 cm. Then the height of water in the cuboid shaped vessel in cm is

(a) $20\pi/3$ (b) $60\pi/3$ (c) $30\pi/4$

(d) $40\pi/3$ (e) $27\pi/4$

15) The price of a pen, a pencil and an eraser are in the ratio 4:3:2. If the price of 3 pens, 2 pencils and an eraser is Rs. 200, find the prices of 3 pens, 2 pencil and an eraser as a triad (pen, pencil, eraser).

(a) (120, 60, 20)   (b) (120, 40, 40)   (c) (80, 60, 60)

(d) (110, 75, 15)   (e) (100, 60, 40)

16) The value of $log_2 3 = x$ then $log_4 12$ is equal to

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

(d) $\dfrac{x+3}{2}$ (e) $\dfrac{x+2}{3}$

17) If the sum of the first n cubic numbers is $\left[\dfrac{n(n+1)}{2}\right]^2$, then the sum $5^3 + 6^3 + 7^3 + 8^3 + 9^3$ is

(a) 2215   (b) 1925   (c) 1825

(d) 2125   (e) 2225

18) If $\dfrac{36x^5}{(9x^2)^{2/3} \times 27x} = 2^a \times 3^b \times x^c$, then the triad (a, b, c) is equal to

| (a) (2, -7/3, -8/3) | (b) (3, -7/3, -8/3) | (c) (3, 7/3, 8/3) |
| (d) (2, -7/3, 8/3) | (e) (2, 7/3, 8/3) | |

19) A invested Rs. 500,000 on 1ˢᵗ January 2021 in a business. His friend B joined this business on 1ˢᵗ April 2021 with Rs 1,000,000. In what ratio should they divide the year end profits.

| (a) $A : B = 3 : 2$ | (b) $A : B = 1 : 1$ | (c) $A : B = 2 : 3$ |
| (d) $A : B = 3 : 4$ | (e) $A : B = 1/3 : 1/2$ | |

20) The solution to the equation $log_9(2 - 3x) = log_3 \left(\dfrac{1}{3}\right)$ is

| (a) $x = 27/17$ | (b) $x = 15/27$ | (c) $x = 16/27$ |
| (d) $x = 17/27$ | (e) $x = 27/16$ | |

21) If a fraction has its denominator 7 more than its numerator (x) and the fraction is positive, but less than 1/2, then the numerator is

| (a) $x < 7$ | (b) $7 < x < 14$ | (c) $x < -7$ |
| (d) $x < 14$ | (e) $-14 < x < -7$ | |

22) Rs X invested at compound interest of $100r$ % per annum for 2 years yields the same amount when it is invested at simple interest of 10 % for 5 years. Then the value of r is

| (a) $\dfrac{2-\sqrt{3}}{\sqrt{2}}$ | (b) $\dfrac{3-\sqrt{3}}{\sqrt{2}}$ | (c) $\dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{2}}$ |
| (d) $\dfrac{4-\sqrt{2}}{\sqrt{2}}$ | (e) $\dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{3}}$ | |

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23) The sum $S = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots \frac{1}{n^2} + \cdots$ is

(a) more than 10

(b) is infinite

(c) less than 4

(d) is equal to 2

(e) is equal to 1

24) Which of the following are possible solutions of $73 \equiv x \pmod 7$

(a) 3

(b) 7

(c) 10

(d) -4

(e) 1

25) The remainder when 2^{18} is divided by 17 is

(a) 13   (b) 4   (c) 7

(d) 5   (e) 11

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