UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2016 –1st Year Examination – Semester 1

EN1201: Introductory Mathematics

Multiple Choice Question Paper

29th May 2016

(TWO HOUR)

Important Instructions :

- The duration of the paper is **2(two) hours**.
- The medium of instruction and questions is English.
- The paper has 40 **questions** and **7 pages**.
- 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.**
- Calculators are not allowed

1) $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ is equal to

(a) $5+2\sqrt{6}$ (b) $5+\sqrt{6}$ (c) $\frac{1}{5-2\sqrt{6}}$ (d) $\frac{1}{5-\sqrt{6}}$ (e) 5

2) $0.3^2 + 0.7^2 - 2 \times 0.3 \times 0.7$ is equal to

(a) 0.49 (b) -0.49 (c) 0.01 (d) 0.16 (e) -0.16

3) If the length of a box is 2.5cm to the first decimal point, then the smallest possible value of the actual length is

(a) 2.45 cm (b) 2.40 cm (c) 2.49 cm (d) 2.44 cm (e) 2.50 cm

4) $(-1)^2 + (-1)^3 + (-1)^4 + (-1)^5$ is equal to

(a) 4 (b) $[1 + (-1)^2]^3$ (c) 0
(d) $[1 - (-1)^2]^3$ (e) -4

5) How many integers are there between $\sqrt{19}$ and $\sqrt{90}$

(a) 5 (b) 4 (c) $\sqrt{81} - \sqrt{25}$ (d) 8 (e) $\sqrt{100} - \sqrt{25}$

6) The Lowest Common Multiple of 2^2x3^2x4 and 2^3x3

(a) 144 (b) 288 (c) 24 (d) 12 (e) $2^4 \, X \, 3^2$

7) The sum 1+3+5+7+…+99 is equal to

(a) 2300 (b) 2600 (c) 2700
(d) 2500 (e) 2400

8) Consider lines, $A: 2x + 3y = 5$, $B: x - \frac{y}{2} = 7$, $C: -2x + 3y = 2$, $D: y = \frac{2}{3}x - 7$
Which of the above lines are parallel?

(a) A and C (b) A and B (c) B and C (d) A,B and C (e) C and D

9) The perimeter of the smallest rectangle that can be formed using 24 squares $1cm^2$ of area each is

(a) 49 (b) 28 (c) 20
(d) 22 (e) 24

10) If $x + y = 5$ and $x \; and \; y$ are positive integers, then the largest possible value of $\frac{1}{x} + \frac{1}{y}$ is

(a) 1 (b) $\frac{5}{6}$ (c) $\frac{6}{5}$
(d) $\frac{5}{4}$ (e) $\frac{3}{2}$

11) If the sum of the squares of two consecutive odd integers is 74, then the smaller of the two is

(a) -7 (b) 2 (c) 5
(d) -6 (e) 6

12) If $x = 10$ then $x + x^{-4}$ is equal to

(a) 10.4 (b) 10.04 (c) 10.1
(d) 10.01 (e) 10.0001

13) $\frac{x^2+x-a(a+1)}{x-a}$ is equal to

(a) $x + a - 1$ (b) $x + a + 1$ (c) $x + a$ (d) $x - a$ (e) $x - a + 1$

14) Which of the following is equal to $\frac{5-x}{(x-1)(x+3)}$

(a) $\frac{5}{(x-1)} - \frac{x}{(x+3)}$ (b) $\frac{1}{(x-1)} + \frac{2}{(x+3)}$ (c) $\frac{1}{(x-1)} - \frac{2}{(x+3)}$
(d) $\frac{2}{(x-1)} - \frac{1}{(x+3)}$ (e) $-\frac{2}{(3+x)} - \frac{1}{(1-x)}$

15) If $x - \frac{1}{x} = 2$ then $(x + \frac{1}{x})^2$ is equal to

(a) 6	(b) 4	(c) 3	(d) 8	(e) 2

16) 4999×5001 is equal to

(a) 25,000,009	(b) 24,999,999	(c) 25,000,999
(d) 24,999,909	(e) 25,000,099	

17) The equation of a line perpendicular to the line $y = -\frac{1}{3}x + 7$ is /are

(a) $y - 3x = 2$	(b) $3y - x = 5$	(c) $2y - 3x = 7$	(d) $3y + x = 2$	(e) $y = 3x + 7$

18) The solution to $0 < |x - 2| < 5$ is

(a) $(-2, 7) \setminus \{0\}$	(b) (-2, 0) ∪ (0 ,7)	(c) $(-3, 7) \setminus \{2\}$
(d) (-3,7)	(e) (-3, 2) ∪ (2 ,7)	

19) The solution to $\left|\frac{x}{x-1}\right| = 3$ is

(a) $0.75, -1.5$
(b) $-0.75, 1.5$
(c) $0.75, 1.5$
(d) $1.5, -1.5$
(e) $0.75, -0.75$

20) The region bounded by $|x| + 2|y| = 1$ is

(a) a square	(b) a rhombus	(c) a rectangle
(d) a parallelogram	(e) a trapezium	

21) The maximum number of cubes of side length 3cm that can be packed in a box of dimensions 40cm by 30cm by50 cm is

(a) 2222	(b) 2100	(c) 2000
(d) 2080	(e) 2200	

22) If $\sin x = \frac{5}{13}$ and $0 < x < 90$ then $\cos x$ is equal to

(a) $\frac{5}{12}$ (b) $\frac{5}{13}$ (c) $\frac{12}{13}$ (d) $\frac{13}{12}$ (e) $\frac{12}{5}$

23) Two vertical poles A and B are $x\ m$ away. The angle of elevation from the base of pole A to the top of pole B is 30 degrees and the angle of elevation from the base of pole B to the top of pole A is 60 degrees. Then the ratio the height of A to the height of B is

(a) 1:3 (b) 1:2 (c) 2:3 (d) 3:2 (e) 3:1

24) The total surface area for two identical spheres is the same as the surface area of a solid cylinder with the same radius r as the sphere. Then the ratio of the radius to the height of the cylinder is

(a) 1:3 (b) 1:9 (c) 2:3 (d) 3:1 (e) 3:2

25) A solid cylinder of radius r and height 3r is melted and n spheres of radius r/10 are made. Then the maximum value of n is

(a) 2000 (b) 2250 (c) 2500 (d) 2750 (e) 3000

26) If $a = 2^5 \times 3^2 \times 5$ and $b = 2^4 \times 3^1 \times 7^2$ then the highest common factor of a and b is

(a) 105 (b) $2^3 \times 6$ (c) 70 (d) $2^5 \times 3$ (e) 48

27) If $x^2 + 2x = y^2 + 2y$ and $x \neq y$ then $x + y$ is equal to

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

28) If the radius of a sphere increases by 10%, then the surface area will increase by

(a) 15% (b) 24% (c) 21% (d) 20% (e) 30%

29) If two angles of a triangle are 47 degrees and 68 degrees to the nearest degree, then the smallest value of the third angle is

(a) 65 degrees (b) supplement of (47.5+68.5) degrees (c) 64.5 degrees

(d) 64 degrees (e) supplement of (47+68) degrees

30) The shape of a quadrilateral ABCD with interior angles in the ratio A:B:C:D = 1:2:3:4 is

(a) trapezium (b) parallelogram (c) rhombus (d) square (e) rectangle

31) If $x_n = 3 + 2(-1)^n$ then x_{100} is equal to

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

32) If $x_n = 3x_{n-1} + 7$ and $x_0 = 3$ then x_2 is equal to

(a) 50 (b) 55 (c) 54 (d) 57 (e) 60

33) A manufacturer sells an item with 10% profit to a wholesaler who in turn sells it to a retailer with a 5% profit. The retailer sells to a consumer with a 10% profit. What is the price the consumer pays as a percentage of the original cost of the manufacturer?

(a) 125% (b) 127.05% (c) 115%
(d) 112.50% (e) 130.25%

34) A man invests Rs. 100,000 in a bank account that pays a 10% interest per annum. If he withdrew Rs. 20,000 at the end of each year, what is his account balance at the beginning of the third year?

(a) 79000 (b) 80,000 (c) 81,000 (d) 80,500 (e) 78,500

35) If the nth term of 1,3,6,10,15,21,28,……. is $\frac{n(n+1)}{2}$, then the nth term of 10,15,21,28,…. is

(a) $2(n^2+n+1)$ (b) (n^2+3n+1) (c) $\left(\frac{n}{2}+2\right)(n+3)$ (d) $2(n^2-3n+5)$ (e) $\frac{1}{2}(n^2+7n+12)$

36) The LCM of $a = 2^5 \times 3^2 \times 5^1$ and $b = 2^4 \times 3^1 \times 7^2$ is

(a) $2 \times 3 \times 5 \times 7$ (b) $2^4 \times 3^2 \times 7^2 \times 10$ (c) $2^4 \times 3^1 \times 5^1 \times 7$ (d) $2^5 \times 3^2 \times 5^1 \times 7^2$

(e) $2^4 \times 3^2 \times 5^1 \times 7^2$

37) The sum of the first n positive odd numbers is

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

38) Two goods A and B with current prices Rs. 200 and Rs. 100 respectively have gone up in prices by 10% and 16% respectively. What is the percentage increase in cost for a consumer who buys one unit of each of A and B?

(a) $\left(\frac{2\times10+1\times16}{3}\right)$ % (b) 14% (c) 13% (d) 12% (e) $\left(\frac{10+16}{2}\right)$ %

39) If the length of a rectangle is 4cm to the nearest cm and its area is $14cm^2$ to the nearest square cm, then the smallest possible breadth of the rectangle is

(a) 3.0 (b) 3.5 (c) 4.0 (d) 4.5 (e) 5.0

40) If all dimensions of a cuboid are increased by 10% then the increase in the volume of the cuboid is

(a) $[(1.1)^3-1]\times100\%$ (b) $[3\times1.1-1]\times100\%$ (c) 31%

(d) 33.1% (e) 33%

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