UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2013 /2014 – 1st Year Examination – Semester 1

EN1201: Introductory Mathematics
Multiple Choice Question Paper
21st March 2014
(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 **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 **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) 0.6×0.023 is equal to

   (a) 0.00138   (b) 0.0138   (c) 0.138   (d) 1.38   (e) 13.8

2) $\sqrt{7056}$ is equal to

   (a) 76   (b) 84   (c) $3\sqrt{784}$ (d) 86   (e) $4\sqrt{441}$

3) $-6 + 4 \div 2 - 5 \times 3$ is equal to

   (a) -12   (b) -14   (c) -17   (d) -18   (e) -19

4) A man is required to take a tablet once every 4 hours, a capsule once every 6 hours and a syrup once every 10 hours. If he takes all three together at 6.00 a.m. on a Monday morning, when will he take all three together again?

   (a) Tuesday 6.00 a.m.   (b) Tuesday 6.00 p.m.   (c) Wednesday 6.00 a.m.
   (d) Wednesday 6.00 p.m.   (e) Thursday 6.00 a.m.

5) $\dfrac{0.012 \times (0.2)^2 \times 4}{0.96}$ is equal to

   (a) 2.0   (b) 0.2   (c) 0.02   (d) 0. 002   (e) 0.0002

6) Sunil took a bag of mandarins to school. He gave $\frac{1}{10}$ of the fruits to Kamal, $\frac{1}{5}$ to Rajan and 15% to Riaz. The rest he distributed equally among 11 other students in the class. If each of these 11 students received 3 fruits each, how many fruits did Sunil take to school?

   (a) 60   (b) 70   (c) 80   (d) 90   (e) 100

7) 1950×2050 is equal to

   (a) 3 999 500   (b) 3 998 500   (c) 3 997 500
   (d) 3 996 500   (e) 3 994 500

8) If $\dfrac{x}{y} - \dfrac{y}{x} = 4$, then $\dfrac{x^2}{y^2} + \dfrac{y^2}{x^2}$ is equal to

   (a) 20   (b) 18   (c) 16   (d) 14   (e) 12

9) $\dfrac{1}{(a-b)^2} + \dfrac{1}{b^2-a^2}$ is equal to

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

(d) $\dfrac{2b}{(a^2-b^2)(a-b)}$ (e) $\dfrac{2b}{(b^2-a^2)(b-a)}$

10) $8x^4 - 50x^2y^2$ is equal to

(a) $2x^2(4x^2 - 25y^2)$ (b) $2x^2(2x - 5y)^2$ (c) $2x^2(2x - 5y)(2x + 5y)$
(d) $2(2x^2 - 5y)(2x^2 + 5y)$ (e) $2(2x^2 - 5xy)(2x^2 + 5xy)$

11) $x^2 + 6y - 3x - 2xy$ is equal to

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

12) If $T = 6\left(\dfrac{r - \frac{H}{3}}{8}\right)^{\frac{1}{3}}$, then H is equal to

(a) $3r - \dfrac{1}{9}T^3$ (b) $3r + \dfrac{1}{9}T^3$ (c) $3\left[r - 8\left(\dfrac{T}{6}\right)^3\right]$

(d) $3\left[r + 8\left(\dfrac{T}{6}\right)^3\right]$ (e) $r - \dfrac{1}{27}T^3$

13) If $T = 6\left(\dfrac{r - \frac{H}{3}}{8}\right)^{\frac{1}{3}}$, $r = -29$ and $H = -6$, then T is equal to

(a) -3   (b) 6   (c) -6   (d) 9   (e) -9

14) If $-3x + 9y = a$ and $-5x - y = b$, then $x - y$ is equal to

(a) $\dfrac{a+b}{8}$ (b) $\dfrac{a-b}{8}$ (c) $\dfrac{b-a}{8}$

(d) $\dfrac{a^2-b^2}{8}$ (e) $-\dfrac{a+b}{8}$

15) The sum of three consecutive integers is equal to 201. Then which of the following is/are **not** one of these integers?

(a) 64   (b) 65   (c) 67   (d) 68   (e) 69

16) The graph of which of the following equation/s is perpendicular to the graph of $3y - x = 2$?

(a) $y - 3x = 0$ (b) $y + 3x = 0$ (c) $\frac{1}{6} y = -\frac{1}{2}x - 3$

(d) $-\frac{1}{6} y = -\frac{1}{2}x - 3$ (e) $\frac{1}{2} y = -\frac{1}{6}x - 3$

17) Kamala has Rs. 2, Rs. 5 and Rs. 10 coins in her purse. The total number of coins in the purse is 12 and the total value of the coins is Rs. 58. If the number of Rs 5 coins in the purse is three times the number of Rs. 10 coins in the purse, then the number of Rs. 2 coins in the purse is

(a) 9   (b) 8   (c) 6   (d) 5   (e) 4

18) The solution/s of the equation $12x^2 - 5x - 2 = 0$ is/are

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

19) The coordinates of the intersection point of the straight line $3x + 2y = 11$ and the straight line which passes through the two points (3, 6) and (0, 3) are

(a) (1, 4)   (b) (-1, 7)   (c) (3, 1)   (d) (-3, 10)   (e) (0, 5.5)

20) The solution set of the inequality $4x - 10 < -2x - 4 \le x + 8$ is,

(a) $\{x \mid -4 < x \le 1\}$ (b) $\{x \mid -4 \le x < 1\}$ (c) $\{x \mid -1 < x \le 4\}$
(d) $\{x \mid -1 \le x < 4\}$ (e) $\{x \mid -4 \le x < -1\}$

21) The solutions of $|3x + 5| - 3 = |2x + 6|$ are

(a) $x = -4$ and $x = \frac{14}{5}$ (b) $x = -4$ and $x = -\frac{8}{5}$ (c) $x = 4$ and $x = -\frac{8}{5}$

(d) $x = 4$ and $x = -\frac{14}{5}$ (e) $x = -\frac{8}{5}$ and $x = -\frac{14}{5}$

22) If $\frac{-x - 2}{3x - x^2} - \frac{2}{x} = \frac{1}{x - 3}$, then x is equal to

(a) -5   (b) 5   (c) -4   (d) 4   (e) 3

23) The base of an isosceles triangle is 4 cm longer than its altitude. If the base is the longest side of the triangle and the area of the triangle is 48 cm², what is the perimeter of the triangle?

(a) 24 cm   (b) 32 cm   (c) 30 cm   (d) 28 cm   (e) 26 cm

24) Which of the following is equal to 180 km h⁻¹?

(a) 50 ms⁻¹   (b) 60 ms⁻¹   (c) 75 ms⁻¹   (d) 80 ms⁻¹   (e) 90 ms⁻¹

25) A circle of radius $\frac{r}{2}$ cm is cut out from a circle of radius $2r$ cm. What is the ratio of the area of the circle that is cut out to the area of the remaining portion?

    (a) 1 : 3   (b) 1 : 4   (c) 1 : 7   (d) 1 : 15   (e) 1 : 16

26) A solid metal cylinder of radius r cm and height $2r$ cm is melted and solid metal spheres of radius $\frac{r}{2}$ cm are formed. If there is no wastage, how many such spheres can be formed?

    (a) 16   (b) 12   (c) 8   (d) 4   (e) 2

27) If $\theta = 60^o$ then which of the following has the greatest value?

    (a) $\sin \theta$ (b) $\cos \theta$ (c) $\tan \theta$ (d) $\operatorname{cosec} \theta$ (e) $\sec \theta$

28) Let $A = \cos 30^o \sin 30^0 - \tan 60^o$. Then which of the following is true?

    (a) $1 < A$ (b) $0 < A < 1$ (c) $-1 < A < 0$ (d) $-2 < A < -1$ (e) $A < -2$

29) If the angle of elevation to the top of a building from a point on the flat ground which is 30 m away from the building is 30°, what is the height of the building to the nearest meter?
($\sin 30^o = 0.5$, $\tan 30^o = 0.5773$, $\cos 30^o = 0.8660$)

    (a) 15   (b) 17   (c) 26   (d) 53   (e) 60

30) Five people working 8 hours a day can cut a drain in 6 days. How many days will four people working 6 hours a day require for the same task?

    (a) 8   (b) 9   (c) 10   (d) 11   (e) 12

31) In a 200 m race, Amal beats Kamal by 10 m. If Amal's average speed was 9 ms^{-1}, what was Kamal's average speed?

    (a) 8.75 ms^{-1} (b) 8.65 ms^{-1} (c) 8.55 ms^{-1} (d) 8.45 ms^{-1} (e) 8.35 ms^{-1}

32) The magnitude of the interior angles of a quadrilateral are in the ratio 2 : 3 : 3 : 4. Which of the following **cannot** be the magnitude of an interior angle of this quadrilateral?

    (a) 45° (b) 60° (c) 90° (d) 120° (e) 150°

33) A man spends 42% of his monthly salary on food and 12% on transport. If the amount he spent on food is Rs. 16 800, how much was his transport cost?

    (a) Rs. 4800   (b) Rs. 4600   (c) Rs. 4400
    (d) Rs. 4200   (e) Rs. 4000

34) A trader sells an item for Rs. 170 at a loss of 15%. What was the original price of the item?

| (a) Rs. 195.50 | (b) Rs. 200 | (c) Rs. 205.50 | (d) Rs. 210 | (e) Rs. 215.50 |

35) The simple interest on a loan taken for three years period was Rs. 216. If the principal amount was Rs. 600, what was the interest rate per annum?

| (a) 8% | (b) 9% | (c) 11% | (d) 12% | (e) 14% |

36) The sum of the first n terms of an arithmetic progression is given by $S_n = -n(n+2)$. What is the common difference of this progression?

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

37) The sum of the first n terms of an arithmetic progression is given by $S_n = -n(n+2)$. What is the 10th term of this progression?

| (a) -120 | (b) -91 | (c) -60 | (d) -31 | (e) -21 |

38) How many terms are there between 30 and 450 which are divisible by 4?

| (a) 108 | (b) 107 | (c) 106 | (d) 105 | (e) 104 |

39) The 2nd term of a geometric progression is -24 and the 7th term is $\frac{3}{4}$. What is the 5th term of this progression?

| (a) -6 | (b) -3 | (c) 1 | (d) 3 | (e) 6 |

40) $$\sum_{n=3}^{\infty} \frac{2 \times 3^{n+1}}{5^{n-2}}$$

| (a) 81 | (b) 78 | (c) 75 | (d) 73 | (e) 69 |

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