

JK Lakshmipat University Jaipur
INSTITUTE OF MANAGEMENT

End Term Examination, December 2023
BBA, Semester III, 2023-24

Roll No.....

ID1104: BUSINESS MATHEMATICS

Time: 90 Mins. Max. Marks: 35

Signature of the Invigilator:

Instructions to students:

- This is an open book open notes exam, however, use of digital resources like mobiles and laptops is not allowed.
- Please **circle** the correct option.
- Use the space provided below and near the questions for calculations.
- All questions carry equal marks.
- Use of calculator (non-programmable) is allowed.
- Please write the correct answer if you choose the option "None of the above options", to get the full points.

1. The power set of a null set have exactly _____ subsets. (LO2, LO4)
A. Zero
B. One
C. Two
D. Cannot be determined

2. The members of the set $S = \{x, \text{ where } x \text{ is the square of a natural number and } x < 100\}$ are _____. (LO1, LO2, LO4)
A. $\{1, 4, 9, 16, 25, 36, 48, 64, 81, 100\}$
B. $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100\}$
C. $\{1, 4, 9, 16, 25, 36, 49, 64, 81\}$
D. None of the above options _____

3. If $A = \{2, 3\}$ and $B = \{x, \text{ for all } x \text{ belonging to Natural numbers and } x < 3\}$, then $A \times B$ is _____. (LO1, LO2, LO4)
A. $\{(2,1), (2,2), (3,1), (3,2)\}$
B. $\{(1,2), (1,3), (2,2), (2,3)\}$
C. $\{(1,2), (2,2), (3,2), (3,3)\}$
D. None of the above options _____

4. Two finite sets A and B have m and n elements respectively. If the total number of subsets of A is 112 more than the total number of subsets of B, then the value of m is _____. (LO1, LO2, LO4)

- A. 7
- B. 9
- C. 10
- D. None of the above options _____

5. $A = \{1, 2, 3\}$ and $B = \{3, 4\}$. Then $(A \cup B) \times (A \cap B)$ is _____. (LO1, LO2, LO4)

- A. $\{(3,1), (3,2), (3,3), (3,4)\}$
- B. $\{(1,2), (2,3), (3,1), (3,2)\}$
- C. $\{(1,3), (2,3), (3,3), (4,3)\}$
- D. None of the above options _____

6. If $A = \{x, \text{ for all } x \text{ belonging to Natural numbers and } 0 < x < 5\}$, then the number of proper subsets of A is (LO1, LO2, LO4).

- A. 16
- B. 32
- C. 15
- D. None of the above options _____

7. In a city, there are 3 major newspapers A, B and C of which at least two are read by 35% of population. A and B are read by 15%. C is read by 45% and that all the three are read by 10%. Then the percentage of people who read the newspaper C alone is _____. (LO1, LO2, LO4)

- A. 10
- B. 15
- C. 20
- D. None of the above options _____

8. A study was conducted to know the use and effectiveness of Internet Banking and Credit Cards. Out of the 5000 persons surveyed, 847 had neither Internet Banking nor Credit Cards. There were 2587 people using Internet Banking and 1687 people using Credit Cards. How many in the group possessed Internet Banking? (LO1, LO2, LO4)

- A. 61
- B. 125
- C. 115
- D. None of the above options_____

9. A survey was conducted to understand the perception of road users. A certain number of responses were collected from the people and the problem related "Over speed of vehicles" and "Road being narrower affecting heavy traffic". The number of responses reporting both the types of problems were 160, while 260 respondents reported that the road being narrower was the only problem affecting traffic. Responses of facing neither of the problems and both the problems were also given by the people. If the responses of over speed, road being narrower, neither of the problems, and total number of responses were in the ratio of 12: 12: 20: 44. How many responses were collected. (LO1, LO2, LO4)

- A. 240
- B. 250
- C. 230
- D. None of the above options_____

10. An office has 530 employees, and all these employees drink either Coffee or Tea, or both Coffee and Tea. Four-hundred and fifty employees drink Tea only, and 350 employees drink Coffee only. The Personnel Manager must decide whether a contract can be given so that Coffee and Tea are arranged in the office and caterer can be approached. What is % of employees drinking both Coffee and Tea? (LO1, LO2, LO4)

- A. 55%
- B. 50%
- C. 53%
- D. None of the above options_____

11. The coordinates of points lying on both x- and y- axes are _____. (LO1, LO2, LO4)

- A. (1, 1)
- B. (0, 1)
- C. (1, 0)
- D. None of the above options _____

12. Find the coordinates of a point that lies on the y-axis at a distance of -6 units from the x-axis? (LO1, LO2, LO4)

- A. (0, -8)
- B. (8, 0)
- C. (8, 8)
- D. (0, 8)

13. Find the value of a , if the distance between the points P $(-3, -14)$ and Q $(a, -5)$ is 9 units. (LO1, LO2, LO4)

- A. 3
- B. 5
- C. -3
- D. None of the above options _____

14. What is the slope of the line represented by the equation $5x + 12y = 18$. (LO1, LO2, LO4)

- A. $5/12$
- B. $12/5$
- C. $-5/12$
- D. $-12/5$

15. The points $(-1, -2)$, $(1, 0)$, $(-1, 2)$, $(-3, 0)$ in the given sequence form what type of a quadrilateral. (LO1, LO2, LO4)

- A. Rhombus
- B. Parallelogram
- C. Square
- D. Rectangle

16. The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is $(LO1, LO2, LO4)$
- A. 5
 - B. 6
 - C. 11
 - D. 12

17. The equations of three lines are provided below. $(LO1, LO2, LO4)$

I. $y = 3x - 12$

II. $2y = 6x - 9$

III. $y = 3x - 7$

- A. I, II, and III are perpendicular to each other.
- B. I, and III are parallel to each other and perpendicular to II.
- C. I and III are perpendicular to each other and parallel to II.
- D. None of the above options ___ I, II, and III are parallel to each other _____

18. Find the equation of a line passing through $(4, -3)$, and has the slope of perpendicular line as $2/3$. $(LO1, LO2, LO4)$

A. $3x + 2y - 6 = 0$

B. $3x - 2y = 6$

C. $x - 3/2 y = 3$

- D. None of the above options _____

19. Find the equation of a line passing through the point $(1, 10)$, and is perpendicular to the line $y = -0.5x + 10$. $(LO1, LO2, LO4)$

A. $y = 2x + 6$

B. $y = 2x - 6$

C. $y = 0.5x + 10$

- D. None of the above options _____

20. Find the area of a rhombus whose length of diagonals are given as 6 cm and 7 cm. $(LO1, LO2, LO4)$

A. 21 cm^2

B. 28 cm^2

- C. 30 cm^2
- D. 42 cm^2

21. Find the length of the edge of a cube whose surface area is given as 54 cm^2 . (LO1, LO2, LO4)

- A. 3 cm
- B. 6 cm
- C. 9 cm
- D. 12 cm

22. The area of a trapezium is 480 cm^2 , the distance between two parallel sides is 15 cm and one of the parallel sides is 20 cm. The other parallel side is _____. (LO1, LO2, LO4)

- A. 20 cm
- B. 34 cm
- C. 44 cm
- D. 50 cm

23. The height of a cuboid whose volume is 275 cm^3 and base area is 25 cm^2 is: _____. (LO1, LO2, LO4)

- A. 10 cm
- B. 11 cm
- C. 12 cm
- D. 13 cm

24. The radius of a cylinder, a cone and a sphere are in the ratio 1:2:3, and the ratio of their heights is 5:6:7. If the volume of the sphere is 4851 cm^3 , then find the sum of the volumes of cylinder and cone. (LO1, LO2, LO4)

- A. 672.5 cm^3
- B. 673.5 cm^3
- C. 771.5 cm^3
- D. None of the above options _____

25. A cuboid whose sides are 8 cm, 27 cm, and 64 cm is melted to form a cube. What is the respective ratio of the total surface area of the cube and the cuboid. (LO1, LO2, LO4)

- A. 237:329
- B. 216: 307
- C. 203:291
- D. 249:349

26. The ratio of the sides of a triangle is 11:11:4. If the area of triangle is $2\sqrt{117}$ cm², then what is the length of the equal sides? (LO1, LO2, LO4)

- A. 3 cm
- B. 9 cm
- C. 11 cm
- D. 13 cm

27. The length of a rectangle is three times its breadth. If its length is decreased by 7 cm and breadth is increased by 7 cm, then the area of the rectangle is increased by 147 cm². Identify the length of the initial rectangle. (LO1, LO2, LO4)

- A. 33 cm
- B. 36 cm
- C. 39 cm
- D. 42 cm

28. A wire is in the form of a square with side 44 cm. It is bent to form a circle. What is the radius of the circle? (LO1, LO2, LO4)

- A. 16 cm
- B. 21 cm
- C. 32 cm
- D. None of the above options_____

29. Given that $f(x)=x+1$ and $g(x)=x^2-2x+5$, find $(f+g)(11)$. (LO1, LO2, LO4)

A. 102

B. 121

C. 126

D. None of the above options_____

30. JKLU states that the number of men, M, and the number of women, W, receiving bachelor degrees t years since 2012 can be modelled by the functions $M(t) = t^2 - t + 526$, and $W(t) = 474 + 2t$, respectively. Let $N(t)$ be the total number of students receiving bachelor's degrees at JKLU t years since 2012. Find the number of students receiving bachelor's degree at JKLU in 2023. (LO1, LO2, LO4)

A. 636

B. 496

C. 140

D. None of the above options_____

31. The distance and time that Jordan runs each day depends on the number of hours, h , that she works. The distance, D , in meters, and time, T , in minutes, that she runs are given by the functions $D(h) = -0.5h + 8.5$ and $T(h) = -6h + 90$ respectively. Let function S represent the average speed at which Jordan runs on a day in which she works h hours can be given by_____. (LO1, LO2, LO4)

A. $S(h) = \frac{-0.5h + 8.5}{-6h + 90}$

B. $S(h) = (-0.5h + 8.5) (-6h + 90)$

C. $S(h) = (-0.5h + 8.5) + (-6h + 90)$

D. None of the above options_____

32. If $f(x) = \frac{1}{x-3}$, then $f(4) + f^{-1}(4)$ is_____. (LO1, LO2, LO4)

A. 0

B. 2

C. 8

D. None of the above options_____

33. If $f(x) = ax^2 + 5$, then $f(x + 3) - f(x)$ is _____. (LO1, LO2, LO4)

A. $6a + 9ax$

B. $6ax + 9a$

C. $21a$

D. None of the above options _____

34. If $f(x) = 3x + 2$ & $g(x) = x^2 - 1$. Find $f(g(-3))$. (LO1, LO2, LO4)

A. 13

B. 20

C. 26

D. 32

35. Given $f(x) = x^3 + 1$, $g(x) = 2x + 5$, and $h(x) = \{f(x)\}^2 - g(x)$. Find $h(-2)$. (LO1, LO2, LO4)

A. 58

B. 34

C. -12

D. -23

