

PU-2019

1. Find the odd word from the following.
(a) Swimming (b) Sailing (c) Diving (d) Driving
PU-2019
2. Find the odd man out from the following.
(a) 5720 (b) 6715 (c) 4278 (d) 2640
PU-2019
3. If 'CAB' is coded as 'XZY', how 'DEAF' is coded?
PU-2019
4. John said to Mary, "The son of your only brother is the brother my wife." How Mary is related to John?
PU-2019
5. Bina is twice as old as Arun but twice younger than Fatima. Chitra is half the age of Arun but is twice older than Deva. Who is the second oldest?
PU-2019
6. A man walks 1 km to East and then he turns to South and walks 5 km. Again he turns to East and walks 2 km. After this he turns to North and walks 9 km. Now, how far is he from his starting point?
PU-2019
7. The number of times the hour hand and the minute hand of a clock are at right angle in a day are
PU-2019
8. If 26th January, 1996 was Friday, what day of the week was on 26th January, 1997?
PU-2019
9. If after 10 years James's age will be 5 times his age 5 years back, What is his present age?
PU-2019
10. In a row of children, Rohan is 7th from left end and 14th from right end. How many children are there in the row?
PU-2019
11. I enjoy _____ songs
PU-2019
12. What is the synonym of PRAGMATIC?
PU-2019
13. What is the synonym of SUCCINCT?
PU-2019
14. What is the antonym of EMINENT?
PU-2019
15. What is the antonym of ENIGMA?
PU-2019
16. Still waters run deep. The parts of speech of DEEP is
PU-2019
17. You will not succeed unless you work hard. The parts of speech of UNLESS is
PU-2019
18. Rajan is getting _____ the car.
PU-2019
19. One must be careful when the luggage contains _____ items.
PU-2019
20. Choose the word that is spelled wrongly.
PU-2019
21. Making a mathematical model to copy the behavior of a real system is known as
PU-2019
22. In peer-to-peer networking, which of the following statements is true?
PU-2019
23. The full form of URL is
PU-2019
24. Several programs are in memory in the state of execution and whenever a program waits for input-output operation to complete, another program is executed by CPU. This is known as
PU-2019
25. The Binary equivalent of the decimal number 25.4375 is
PU-2019
26. _____ standard is used to encode, represent and handle text in many local and international languages?
PU-2019
27. The decimal equivalent of the Hexadecimal number 3A.BC3 is

- A) 58.718 B) 48.635 C) 58.735 D) 68.688
28. Which operation is performed by the following C program segment (p and q are integers)?
 $p = q + p;$
 $q = p - q;$
 $p = p - q;$
- PU-2019**
- A) Doubles the contents of p
 B) Doubles the contents of q
 C) Doubles the contents of p and q
 D) swaps the contents of p and q
29. The following C program segment results in what? for (i = 3; i < 15; i += 3); printf("%d", i);
- PU-2019**
- A) Printing of 15 B) A syntax error
 C) Printing of 12 D) An execution error
30. Who among the following devised a test to know whether a computer system has achieved Intelligence or not?
- PU-2019**
- A) John McCarthy B) Charles Babbage
 C) Alan Turing D) Ada Lovelace
31. One Exabyte is approximately equal to how many Bytes?
- PU-2019**
- A) 10^{15} B) 10^{18}
 C) 10^{21} D) 10^{24}
32. Consider the operation of addition. For two numbers the operation would generate a sum. If the operands are strings, the same operation would produce a third string by concatenation. This feature is known as
- PU-2019**
- A) Encapsulation B) Polymorphism
 C) Inheritance D) Dynamic binding
33. What will be the output of the following C language statement?
 $\text{printf}("%c", 100);$
- PU-2019**
- A) 100
 B) Garbage
 C) Hexadecimal value of 100
 D) ASCII value of 100
34. Worst case complexity of quick sort algorithm to sort n numbers is
- PU-2019**
- A) $n \cdot \log n$ B) n
 C) $n \cdot n$ D) $\log n$
35. The command 'mv' in Unix is used for
- PU-2019**
- A) Removing a file B) Renaming a file
 C) Copying a file to other D) Deleting a file
36. If $f(x) = |x| + x^2$, then $f'(-1) = ?$
- PU-2019**
- (a) -3 (b) -1 (c) 1 (d) 3
37. The differentiation of $\sin x$ with respect to $\cos x$ is ?
- PU-2019**
- (a) $\tan x$ (b) $-\tan x$ (c) $\cot x$ (d) $-\cot x$
38. $\int \ln e^{2x} dx = ?$
- PU-2019**
- (a) $x + c$ (b) $x^2 + c$
 (c) $\ln x + c$ (d) $e^x + c$
39. Suppose three dice are thrown. What is the probability to get equal number on the face of each one?

- (a) 1/6 (b) 1/3 (c) 1/36 (d) 1/12
40. What is the value of v if $A = \begin{bmatrix} 3 & 4 \\ 6 & v \end{bmatrix}$ is a singular matrix?
- PU-2019**
- (a) 5 (b) 6 (c) 8 (d) 7
41. If $A = \{1, 2, 3\}$ and $B = \{4, 5\}$, which of the following is not a function from A to B?
- PU-2019**
- (a) $\{(1, 4), (2, 5), (3, 4)\}$
 (b) $\{(1, 4), (2, 4), (3, 4)\}$
 (c) $\{(2, 4), (3, 5), (1, 4)\}$
 (d) $\{(1, 4), (1, 5), (2, 4), (2, 5), (3, 4), (3, 5)\}$
42. $i^{100} + i^{101} + i^{102} + i^{103} = ?$
- PU-2019**
- (a) 0 (b) 1 (c) I (d) -i
43. If the remainder obtained by dividing $f(x) = kx^3 - 4x^2 - 3x + 5$ by $x+1$ is 3, the value of k is
- PU-2019**
- (a) 1 (b) -1 (c) 2 (d) -2
44. What is the quotient obtained after dividing $x^3 - 6x^2 + 11x - 6$ by $x^2 - 5x + 6$?
- PU-2019**
- (a) $x+1$ (b) $x-1$ (c) $x+2$ (d) $x-2$
45. $\sin(x - \pi/2) = ?$
- PU-2019**
- (a) $\sin x$ (b) $\cos x$ (c) $-\sin x$ (d) $-\cos x$
46. $\cos(\sin^{-1}(\sqrt{3/2})) = ?$
- PU-2019**
- (a) 0 (b) 1 (c) 1/2 (d) $\sqrt{3}$
47. If $\log(x+2) - \log(x-1) = \log(2)$, the value of x =
- PU-2019**
- (a) 2 (b) 4 (c) 3 (d) 5
48. If $9 + e^{(2x-4)} = 10$, the value of x =
- PU-2019**
- (a) 2 (b) 3 (c) 4 (d) 5
49. What is the 11th term of the sequence $m - 2n, m - n, m, \dots$?
- PU-2019**
- (a) $m + n$ (b) $m + 6n$ (c) $m - n$ (d) $m + 8n$
50. The sum of the series $\sum_{k=1}^{15} k^2$ is
- PU-2019**
- (a) 1200 (b) 875 (c) 1240 (d) 1345
51. Which of the following cannot be used for graphical representation of statistical data?
- PU-2019**
- (a) Bar chart (b) Histogram
 (c) Frequency polygon (d) Flow chart
52. If sum of the roots of a quadratic equation is 5 and the product of the roots is 6, then the quadratic equation is
- PU-2019**
- (a) $x^2 - 5x + 6 = 0$ (b) $x^2 - 5x - 6 = 0$
 (c) $x^2 + 5x - 6 = 0$ (d) $x^2 + 5x + 6 = 0$
53. The highest common factor of the polynomials: $20x^2 - 9x + 1$ and $5x^2 - 6x + 1$ is
- PU-2019**
- (a) $5x+1$ (b) $5x - 1$ (c) $4x-1$ (d) $4x+1$
54. If e is the edge of a cube, the total surface area of the cube is
- PU-2019**

55. Which of the following is not a convex region?
 (a) e^2 (b) $3e^2$ (c) $6e^2$ (d) $8e^2$
PU-2019
- (a) $\{(x, y): x^2 + y^2 \leq 1\}$
 (b) $\{(x, y): x^2 + y^2 \geq 1\}$
 (c) $\{(x, y): 4x^2 + 9y^2 = 36\}$
 (d) $\{(x, y): y \geq 1 \text{ and } y \leq 4\}$
56. The harmonic mean of the numbers 1, 4, and 4 is
PU-2019
- (a) 2 (b) 3 (c) 2.5 (d) 1.5
57. If the coefficients of x^7 and x^8 in the expansion of $(2+x/3)^n$ are equal, then $n =$
PU-2019
- (a) 56 (b) 55 (c) 45 (d) 15
58. The equation of the line joining the points (1, 3) and (-2, 5) is
PU-2019
- (a) $3x + 2y + 23 = 0$ (b) $5x - 4y + 9 = 0$
 (c) $2x + 3y - 11 = 0$ (d) $2x - 3y + 11 = 0$
59. The points (0,0), (3,4), (7,4) and (4, 0) form a
PU-2019
- (a) Rhombus (b) Square
 (c) Parallelogram (d) Rectangle
60. What is the angle between the vectors $3i+2j-5k$ and $5i-3j-2k$?
PU-2019
- (a) 30° (b) 60° (c) 45° (d) 90°
61. The standard deviation is the best measure of _____
PU-2019
- (a) Correlation (b) Frequency
 (c) Regression (d) Dispersion
62. If the mean of a data is 22.5 and the median value is 20, what is the value of mode?
PU-2019
- (a) 20 (b) 30 (c) 15 (d) 18
63. The number of different permutations of the word 'BANANA' is
PU-2019
- (a) 60 (b) 720 (c) 180 (d) 120
64. The number of diagonals that can be drawn by joining the vertices of an octagon are
PU-2019
- (a) 30 (b) 30 (c) 48 (d) 20
65. If A and B are two sets such that $A \cup B$ has 18 elements. If A has 8 elements and B has 15 elements, then the number of elements of $A \cap B$ will be
PU-2019
- (a) 7 (b) 5 (c) 4 (d) 8
66. $\lim_{x \rightarrow 0} (x - \sin x) / x^3$ is
PU-2019
- (a) 1/2 (b) 1 (c) 1/6 (d) 2
67. $\lim_{n \rightarrow \infty} (1^2 + 2^2 + 3^2 + \dots + n^2) / n^3 =$
PU-2019
- (a) 1 (b) 0 (c) 1/2 (d) 1/3
68. The derivative of $\sin^2 x$ with respect to x is
PU-2019
- (a) $\sin x$ (b) $\sin 2x$ (c) $\cos 2x$ (d) $\cos x$
69. If the absolute value of $X < 1$, the sum of the infinite series $1 + X + X^2 + X^3 + X^4 + \dots$ is
PU-2019
- (a) 1 (b) $1+X$
 (c) $1/(1-X)$ (d) $1/(1+X)$

70. The distance of the point P(x, y, z) from the x-axis is
PU-2019
- (a) $\sqrt{(y^2 + z^2)}$ (b) $\sqrt{(z^2 + x^2)}$
 (c) $\sqrt{(x^2 + y^2)}$ (d) $\sqrt{(x^2 + y^2 + z^2)}$
71. There are 10 lamps in a hall and each one of them can be switched on independently. The number of ways in which the hall can be illuminated is
PU-2019
- (a) 2020 (b) 1010 (c) 1023 (d) 23456
72. If $\cos \alpha, \cos \beta, \cos \gamma$ are direction cosines of a line, then the value of $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$
PU-2019
- (a) 1 (b) 0 (c) 3 (d) 2
73. The relation $y = A \sin x + B \cos x$, where A and B are any constants can be represented by the differential equation
PU-2019
- (a) $dy/dx = y$ (b) $d^2y/dx^2 + y = 0$
 (c) $d^2y/dx^2 = y$ (d) $dy/dx = -y$
74. The number relations on set A containing n elements is
PU-2019
- (a) 2 to the power of n (b) n^2
 (c) 2 to the power of n^2 (d) 2 to the power of $2n$
75. The area of the region bounded by the curve $y=2x-x^2$ and the line $y = x$ is
PU-2019
- (a) 1/3 (b) 1/2 (c) 1/4 (d) 1/6

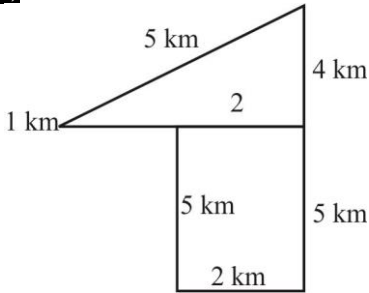
PU -2019 ANSWERS

1	2	3	4	5	6	7	8	9	10
D	C	C	C	B	D	D	B	X	C
11	12	13	14	15	16	17	18	19	20
B	A	D	C	B	A	D	C	B	X
21	22	23	24	25	26	27	28	29	30
D	C	B	B	A	D	C	D	A	C
31	32	33	34	35	36	37	38	39	40
B	B	D	C	B	A	D	B	A	C
41	42	43	44	45	46	47	48	49	50
D	A	A	B	D	C	B	A	D	C
51	52	53	54	55	56	57	58	59	60
D	A	B	C	BC	A	B	C	C	B
61	62	63	64	65	66	67	68	69	70
D	C	A	D	B	C	D	B	C	A
71	72	73	74	75					
C	D	B	C	D					

PU-2019 EXPLANATIONS

1. **Ans. (d)**
2. **Ans. (c)**
 All the no. are even except option B
3. **Ans. (c)**
- | | | | | | |
|---|---|---|----|----|----|
| 3 | 1 | 2 | 24 | 26 | 25 |
| C | A | B | X | Z | Y |
- From this place, the rank of 6 is calculated from end position.
 Similarly
- | | | | |
|----|----|----|----|
| 4 | 5 | 1 | 6 |
| D | E | A | F |
| 23 | 22 | 26 | 21 |
| W | V | Z | U |
4. **Ans. (c)**
 Mary – Brother
 Son wife John

Sister of father in law

5. **Ans. (b)** Bina is twice as old as Arun
 Bina : Arun
 4 : 2
 But Bina is twice younger than Fatima.
 That means Fatima is 12 x
 now Chitra is half the age of Arun
 daya Chitra : Arun
 3 : 1 : 2
 That means Daya is second oldest
6. **Ans. (d)**
- 
7. **Ans. (d)** The hour hand and minute hand of clockwise made right angle 44.
8. **Ans. (b)**
 26 Jan 1996 → Friday → In the leap year, we have
 26 Jan 1997 → ? 2 ordinary day that means
 Saturday, Sunday
9. **Ans. (c)** After 10 year, James's age will be 5 times his age 5 year
 James
 X
 ↓ -5
 ↓ +10
 5x
 $x + 5 = 5x - 10$
 $15 = 4x$
 $x \Rightarrow \frac{15}{4} = 3.75$
 $[3.75 + 5] \Rightarrow 8.7$
10. **Ans. (c)** Total = left + right - 1
 Total = 7 + 14 - 1 = 20
11. **Ans. (b)** As it is a present continuous tense so answer is 'B' - sub + v₁ + ing + object.
12. **Ans. (a)**
13. **Ans. (d)** Succinct means something that is short and clear also means short and point to point so the nearest meaning synonym is concise.
14. **Ans. (c)** Eminent → means famous as we see the options we cant find the antonym synonym pair (famous = unknown) we need the antonym so answer is 'unknown'
15. **Ans. (b)** Again in Q15 antonym synonym rule is applied mystery and understood are antonym

- synonym pair. We need antonym for enigma. So answer is 'B' understood .
16. **Ans. (a)** In still waters run deep, deep in an adverb as it is qualifying the verb 'still'.
17. **Ans. (d)** In this question, unless is a conjunction as it is combining two sentences.
18. **Ans. (c)** The correct answer is out of As for the short distance vehicles when we leaves it, we use the phrase out of.
19. **Ans. (b)** Correct answer is fragile as it supports the nuance of the sentence handles it carefully.
20. **Ans. (all)** All spellings are correct.
21. **Ans. (d)** Modeling C.
22. **Ans. (c)** Peer mean machine connected to another machine Peer means a person / device who is of the same age or position in society.
23. **Ans. (c)** URL is also known as address of website.
24. **Ans. (b)** Multiprogramming means having multiple program in memory at a time & let CPU executes them one by one switching between.
25. **Ans. (a)** A. $(25.4735)_{10} = (?)_2$ first we will convert 25 into binary using shortest method.
 $(25)_{10} = (11001)_2$
 For fractional part we will make a table
- | | | |
|---------------------------|---|-------------------------------------|
| $.4375 \times 2 = 0.8750$ | 0 | ↓
Ans. (11001.0111) ₂ |
| $.8750 \times 2 = 1.7500$ | 1 | |
| $.7500 \times 2 = 1.5000$ | 1 | |
| $.1000 \times 2 = 1.0000$ | 1 | |
26. **Ans. (d)** Unicode means universal code. It is 16-bit code hence can represent various symbols of every type.
27. **Ans. (c)**
28. **Ans. (d)** This is alternate way of swapping two variables without using third variable. Take P = 10 & Q = 20 and solve.
29. **Ans. (a)** This loop will run in itself without printing any value of i until. It is true, because there is a semicolon after loop statements. So it will print the statement only once only when condition will be false. The value of i at that time will be printed.
30. **Ans. (a)** John McCarthy is considered as father of AI.
31. **Ans. (b)** Gigabyte = 10^9 Tera = 10^{12} Peta = 10^{15} Exa: = 10^{18} .

32. **Ans. (b)** Operator overloading is known as polymorphism.
33. **Ans. (d)** It will print ASCII value of 100 because %C in print f statement.
34. **Ans. (c)** $O(n^2)$. Worst case of quick sort is that when all elements are in sorted form.
35. **Ans. (b)** mv is used to move files or directories from one place to another. If both files are in same disk it simply rename it.
36. **Ans. (a)** $f(x) = |x| + x^2 = \begin{cases} x + x^2, & x \geq 0 \\ -x + x^2, & x \leq 0 \end{cases}$
 $\Rightarrow f' = \begin{cases} 1 + 2x, & x \geq 0 \\ -1 + 2x, & x \leq 0 \end{cases}$
 $\Rightarrow f'(-1) = -1 + 2(-1) = -3$
37. **Ans. (d)** $\frac{df}{dg} = \frac{\frac{df}{dx}}{\frac{dg}{dx}} = \frac{\cos x}{-\sin x} = -\cot x$
38. **Ans. (b)** $\int \log e^{2x} dx = \int 2x dx = x^2 + c$
39. **Ans. (a)** $= \frac{6}{36} = \frac{1}{6}$
40. **Ans. (c)** Singular $\Rightarrow |A| = 0$
 $\Rightarrow \begin{vmatrix} 3 & 4 \\ 6 & v \end{vmatrix} = 0 \Rightarrow 3v - 24 = 0$
 $\Rightarrow v = 8$
41. **Ans. (d)** Not a function.
 As (1, 4), (1, 5), (2, 4), (2, 5), (3, 4), (3, 5) \Rightarrow to each of A unique of B not satisfied.
42. **Ans. (a)** $i^{100} + i^{101} + i^{102} + i^{103}$
 $= i^{100} [1 + i + i^2 + i^3] = 0$
43. **Ans. (a)** Remainder $f(-1)$
 $= -k - 4 + 3 + 5 = 3$
 $-k + 4 = 3$
 $k = 1$
44. **Ans. (b)** As $(x^2 - 5x + 6)(x - 1)$
 $= x^3 - 6x^2 + 11x - 6$
45. **Ans. (d)** $\sin\left(x - \frac{\pi}{2}\right) = -\sin\left(\frac{\pi}{2} - x\right) = -\cos x$
46. **Ans. (c)** $\cos(\sin^{-1} \sqrt{3}/2)$
 $= \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$
47. **Ans. (b)** $\log(x+2) - \log(x-1) = \log 2$

$$\log \frac{x+2}{x-1} = \log 2$$

$$\Rightarrow \frac{x+2}{x-1} = 2 \Rightarrow x+2 = 2x-2 \Rightarrow x = 4$$

48. **Ans. (a)** $9 + e^{2x-4} = 10$
 $\Rightarrow 2x - 4 = 0 \Rightarrow x = 2$

49. **Ans. (d)** $T_{10} = a + 10d$
 $= (m - 2n) + 10(n)$
 $= m + 8n$

50. **Ans. (c)** $\sum_{k=1}^{15} k^2 = \frac{15(15+1)(30+1)}{6}$
 $= \frac{15 \cdot 16 \cdot 31}{6} = 1240$

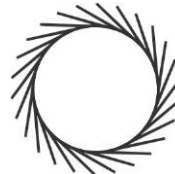
51. **Ans. (d)**

52. **Ans. (a)**
 As $x^2 - Sx + P = 0 \Rightarrow x^2 - 5x + 6 = 0$

53. **Ans. (b)** $20x^2 - 9x + 1$
 $= 20x^2 - 5x - 4x + 1$
 $5x(4x - 1) - 1(4x - 1) = 0$
 $(4x - 1)(5x - 1) = 0$
 Also $5x^2 - 6x + 1 = 0$
 $5x^2 - 5x - x + 1 = 0$
 $5x(x - 1) - 1(x - 1) = 0$
 $(5x - 1)(x - 1) = 0$
 $\Rightarrow 5x - 1$ is common factor

54. **Ans. (c)** As surface area of cube $6l^2 = 6e^2$

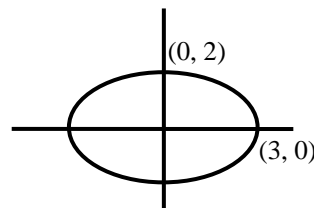
55. **Ans. (b, c)** As $x^2 + y^2 \geq 1$ outside circle
 \Rightarrow Two points taken outside circle



Then line joining passes through inside circle \Rightarrow not convex

$$\text{Also } 4x^2 + 9y^2 = 36 \Rightarrow \frac{x^2}{9} + \frac{y^2}{4} = 1$$

It's only boundary of ellipse so if we take two points on ellipse. Then line joining passes through inside \Rightarrow not convex



56. **Ans. (a)** 1, 4, 4
 $\text{A.M.} = \frac{1 + 1 + 4}{3} = \frac{3}{3} = 1$
 $\Rightarrow \text{H.M.} = 2$

57. **Ans. (b)** Coefficient of $x^7 \rightarrow {}^nC_7 2^{n-7} \left(\frac{x}{3}\right)^7$

Coefficient of $x^8 \rightarrow {}^nC_8 2^{n-8} \left(\frac{x}{3}\right)^8$

\Rightarrow coefficient of $x^7 =$ coefficient of x^8

$\Rightarrow {}^nC_7 \frac{2^{n-7}}{3^7} = {}^nC_8 \frac{2^{n-8}}{3^8}$

$\frac{|n|}{|7n-7|} \cdot 2 = \frac{|n|}{|8n-8|} \cdot \frac{1}{3}$

8.2. $3 = n - 7 \Rightarrow n = 55$

58. **Ans. (c)** Equation of line joining (1, 3), (-2, 5)

$y - 3 = \frac{5-3}{-2-1}(x-1)$

$-3(y-3) = 2(x-1)$

$2x + 3y - 11 = 0$

59. **Ans. (c)** A(0, 0), B(3, 4), C(7, 4), D(4, 0)

Mid point of AC $\left(\frac{7}{2}, \frac{4}{2}\right)$

BD = $\left(\frac{7}{2}, \frac{4}{2}\right) \Rightarrow$ parallelogram

Here slope of AB = $\frac{4-0}{3-0} = \frac{4}{3}$

BC = $\frac{4-4}{7-3} = 0$

\Rightarrow AB not perpendicular to BC

\Rightarrow only parallelogram

60. **Ans. (b)** $\cos \theta = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| \cdot |\vec{b}|} = \frac{15-6+10}{\sqrt{9+4+25} \sqrt{25+9+4}}$

$= \frac{19}{\sqrt{38} \sqrt{38}} = \frac{19}{38} = \frac{1}{2}$

61. **Ans. (d)**

62. **Ans. (c)** Mode = 3 median - 2 mean

$= 3 \times 20 - 2 \times 22.5$

$= 60 - 45 = 15$

63. **Ans. (a)** BANANA

$= \frac{|6|}{|3| |2| |1|} = 60$

64. **Ans. (d)** ${}^8C_2 - 8 = \frac{8(8-3)}{2} = 4.5 = 20$

65. **Ans. (b)** $n(A \cap B) = n(A) + n(B) - n(A \cup B)$
 $= 8 + 15 - 18 = 5$

66. **Ans. (c)** $\lim_{x \rightarrow 0} \frac{x - \sin x}{x^3} \rightarrow \frac{0}{0}$ form

$= \lim_{x \rightarrow 0} \frac{1 - \cos x}{3x^2}$

$= \frac{1}{3} \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$

67. **Ans. (d)** $\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + \dots + n^2}{n^3}$

$\frac{n(n+1)(2n+1)}{n^3}$

$= \lim_{n \rightarrow \infty} \frac{6}{n^3} = \frac{2}{6} = \frac{1}{3}$

68. **Ans. (b)** $\frac{d}{dx} \sin^2 x = 2 \sin x \cos x = \sin 2x$

69. **Ans. (c)** $1 + X + X^2 + \dots = (1 - X)^{-1}$

$= \frac{1}{1 - X}$

70. **Ans. (a)** Distance from x-axis = $\sqrt{y^2 + z^2}$

71. **Ans. (c)** $2^{10} - 1 = 1023$

72. **Ans. (d)** $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma = 3 - (\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma) = 3 - 1 = 2$

73. **Ans. (b)** $y = A \sin x + B \cos x$

$\frac{dy}{dx} = A \cos x - B \sin x$

$\frac{d^2 y}{dx^2} = -A \sin x - B \cos x = -y$

$\frac{d^2 y}{dx^2} + y = 0$

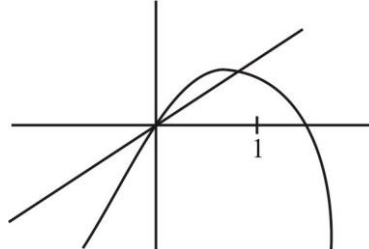
74. **Ans. (c)** No. of relations from A \rightarrow A

$= 2^{n^2}$

75. **Ans. (d)** $y = 2x - x^2 = -(x^2 - 2x) = -(x^2 - 2x + 1) + 1$

$y - 1 = -(x - 1)^2$

$\Rightarrow (x - 1)^2 = -(y - 1)$



$y = 2x - x^2$ and $y = x$

$\Rightarrow x = 2x - x^2$

$\Rightarrow x^2 - x = 0 \Rightarrow x = 0, 1$

\Rightarrow Area $\int_0^1 ((2x - x^2) - x) dx$

$= \int_0^1 (x - x^2) dx$

$= \left| \frac{x^2}{2} - \frac{x^3}{3} \right|_0^1 = \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$