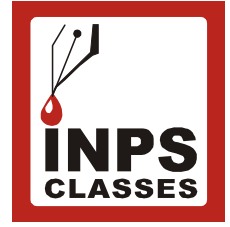# Jamia Millia Islamia (JMI), University – 2021

01. Let F_1 be the set of parallelograms, F_2 the set of rectangles, F_3 the set of rhombuses, F_4 the set of squares and F_5 the set of trapeziums in a plane. Then F_1 may be equal to:

(a) $\left(F_2 \cap F_3\right)$ (b) $\left(F_3 \cap F_4\right)$ (c) $\left(F_2 \cup F_5\right)$ (d) $\left(F_2 \cup F_3 \cup F_4 \cup F_1\right)$

02. If $\left[x^2\right] - 5[x] + 6 = 0$, where [.] denote the greatest integer function, then

(a) $x \in [3, 4]$ (b) $x \in [2, 3)$ (c) $x \in (2, 3)$ (d) $x \in (2, 4)$

03. Which of the following is correct?

(a) $\sin 1^\circ > \sin 1$ (b) $\sin 1^\circ < \sin 1$ (c) $\sin 1^\circ = \sin 1$ (d) $\sin 1^\circ = \dfrac{\pi}{18^\circ} \sin 1$

04. The value of $\tan 3A - \tan 2A - \tan A$ is equal to

(a) $\tan 3A \tan 2A \tan A$ (b) $-\tan 3A \tan 2A \tan A$

(c) $\tan A \tan 2A - \tan 2A \tan 3A - \tan 3A \tan A$ (d) None of these

05. If $\left(\dfrac{1+i}{1-i}\right)^x = 1$, then

(a) $x = 2n + 1$, where $n \in N$ (b) $x = 4n$, where $n \in N$

(c) $x = 2n$, where $n \in N$ (d) $x = 4n + 1$, where $n \in N$

06. The complex number z which satisfies the condition $\left|\dfrac{i+z}{i-z}\right| = 1$ lies on

(a) Circle $x^2 + y^2 = 1$ (b) The x-axis   (c) The y-axis   (d) The line $x + y = 1$

07. The five-digit number divisible by 3 is to be formed using numbers 0, 1, 2, 3, 4 and 5 without repetitions. The total number of ways this can be done is

(a) 216   (b) 600   (c) 240   (d) 3125

08. Given 5 different green dyes, 4 different blue dyes and 3 different red dyes, the number of combinations of dyes which can be chosen taking at least 1 green and 1 blue dye is

(a) 3600   (b) 3720   (c) 3800   (d) 3500

09. The total number of terms in the expansion of $(x + a)^{100} + (x - a)^{100}$ after simplification is

(a) 50   (b) 202   (c) 51   (d) 62

10. The minimum value of $4^x + 4^{1-x}$, $x \in R$, is

(a) 2 (b) 4 (c) 1 (d) 0

11. The coordinates of the foot of perpendiculars from the point (2, 3) on the line $y = 3x + 4$ is given by

(a) $\left(\dfrac{37}{10}, \dfrac{-1}{10}\right)$ (b) $\left(\dfrac{-1}{10}, \dfrac{37}{10}\right)$ (c) $\left(\dfrac{10}{37}, -10\right)$ (d) $\left(\dfrac{2}{3}, \dfrac{-1}{3}\right)$

12. Equations of diagonals of the square formed by the line $x = 0$, $y = 0$, $x = 1$ and $y = 1$ are

(a) $y = x$, $y + x = 1$ (b) $y = x$, $y + x = 2$ (c) $2y = x$, $y + x = 1/3$ (d) $y = 2x$, $y + 2x = 1$

13. The equation of a circle with origin as centre and passing through the vertices of an equilateral triangle whose median is of length $3a$ is:

(a) $x^2 + y^2 = 9a^2$ (b) $x^2 + y^2 = 16a^2$ (c) $x^2 + y^2 = 4a^2$ (d) $x^2 + y^2 = a^2$

14. The locus of a point for which $y = 0$, $z = 0$ is:

(a) Equation of X-axis (b) Equation of Y-axis (c) Equation of Z-axis (d) None of these

15. In an A.P. the pth term is q and the $(p + q)^{th}$ term is 0. Then the qth term is

(a) –q (b) p (c) p + q (d) p – q

16. Let $f(x) = x - [x]$; $x \in R$, [ ] denotes the greatest integer function, then $f\left(\dfrac{1}{2}\right)$ is:

(a) $\dfrac{3}{2}$ (b) 1 (c) 0 (d) –1

17. The standard deviation of some temperature data in °C is 5. If the data were converted into °F, the variance would be

(a) 81 (b) 57 (c) 36 (d) 25

18. Three numbers are chosen from 1 to 20. Find the probability that they are not consecutive

(a) $\dfrac{186}{190}$ (b) $\dfrac{187}{190}$ (c) $\dfrac{188}{190}$ (d) $\dfrac{18}{^{20}_3C}$

19. The probability that at least one of the evens A and B occurs is 0.6. If A and B occurs simultaneously with probability 0.2, then, $P(\bar{A}) + P(\bar{B})$ is

(a) 0.4 (b) 0.8 (c) 1.2 (d) 1.6

20. The maximum number of equivalence relations on the set A = {1, 2, 3} are

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

21. If the set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is

(a) 720 (b) 120 (c) 0 (d) None of these

22. If $\cos^{-1}\alpha + \cos^{-1}\beta + \cos^{-1}\gamma = 3\pi,$ then $\alpha(\beta+\gamma) + \beta(\gamma+\alpha) + \gamma(\alpha+\beta)$ equals

(a) 0   (b) 1   (c) 6   (d) 12

23. If A is square matrix such that $A^2 = I,$ then $(A-I)^3 + (A-I)^3 - 7A$ is equal to

(a) A   (b) $I - A$ (c) $I + A$ (d) 3A

24. Let $f(t) = \begin{vmatrix} \cos t & t & 1 \\ 2\sin t & t & 2t \\ \sin t & t & t \end{vmatrix},$ then $\lim_{t\to 0} \dfrac{f(t)}{t^2}$ is equal to

(a) 0   (b) –1   (c) 2   (d) 3

25. If x, y, z are al different from zero and $\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1+z \end{vmatrix} = 0,$ then the value of $x^{-1} + y^{-1} + z^{-1}$ is

(a) xyz   (b) $x^{-1}y^{-1}z^{-1}$ (c) $-x - y - z$ (d) –1

26. If $f(x) = x^2 \sin\dfrac{1}{x},$ where $x \neq 0,$ then the value of the function f at x = O, so that the function is continuous at x = 0, is

(a) 0   (b) –1   (c) 1   (d) None of these

27. Maximum value of $\left(\dfrac{1}{x}\right)^x$ is

(a) e   (b) e^e (c) $e^{\frac{1}{e}}$ (d) $\left(\dfrac{1}{e}\right)^{\frac{1}{e}}$

28. $\int \dfrac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$ equal to:

(a) $2(\sin x + x\cos\theta) + C$ (b) $2(\sin x - x\cos\theta) + C$

(c) $2(\sin x + 2x\cos\theta) + C$ (d) $2(\sin x - 2x\cos\theta) + C$

29. The degree of the differential equation $\left[1 + \left(\dfrac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = \dfrac{d^2y}{dx^2}$ is :

(a) 4   (b) $\dfrac{3}{2}$ (c) Not defined   (d) 2

30. The solution of the differential equation $\dfrac{dy}{dx} = e^{x-y} + x^2 e^{-y}$ is:

(a) $y = e^{x-y} - x^2 e^{-y} + c$ (b) $e^y - e^x = \dfrac{x^3}{3} + c$ (c) $e^x + e^y = \dfrac{x^3}{3} + c$ (d) $e^x - e^y = \dfrac{x^3}{3} + c$

31. For any vector $\vec{a}$, the value of $\left(\vec{a} \times \hat{i}\right)^2 + \left(\vec{a} + \hat{j}\right)^2 + \left(\vec{a} + \hat{k}\right)^2$ is equal to

(a) $\vec{a}^2$ (b) $\overrightarrow{3a}^2$ (c) $\overrightarrow{4a}^2$ (d) $\overrightarrow{2a}^2$

32. Number of vectors of unit length perpendicular to the vectors $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ and $b = \hat{j} + \hat{k}$ is,

(a) one   (b) two   (c) three   (d) infinite

33. The reflection of the point (α, β, γ) in the xy-plane is:

(a) $(\alpha, \beta, 0)$ (b) $(0, 0, \gamma)$ (c) $(-\alpha, -\beta, \gamma)$ (d) $(\alpha, \beta, -\gamma)$

34. The locus represented by $xy + yz = 0$ is

(a) A pair of perpendicular lines   (b) A pair of paralle lines

(c) A pair of parallel planes   (d) A pair of perpendicular planes

35. Three persons A, B and C fire at a target in turn, starting with A. Their probabilities of hitting the target are 0.4, 0.3 and 0.2 respectively. The probability of two hits is:

(a) 0.024   (b) 0.188   (d) 0.336   (d) 0.452

36. A and B are two students. Their chances of solving a problem correctly are 1/3 and 1/4 respectively. If the probability of their making a common error is 1/20 and they obtain the same answer, then the probability of their answer to be correct is:

(a) 1/12   (b) 1/40   (c) 13/120   (d) 10/13

37. If $a_n = \alpha^n - \beta^n$ and α, β are the roots of the equation $x^2 - 6x - 2 = 0$, then find the value of $\dfrac{a_{10} - 2a_8}{3a_9}$

(a) 2   (b) –2   (c) 3   (d) –3

38. Let the quadratic equation $ax^2 + bx + c = 0$ where a, b, c are obtained by rolling the dice thrice. What is the probability that the equation has equal roots?

(a) 5/216   (b) 1/72   (c) 1/36   (d) 1/216

39. Find the value of $I = \int_{-1}^{1} x^2 \cdot e^{[x^3]} dx$, where ([ ] denotes the greatest integer function)

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

40. Find the number of points, where $f(x) = |2x+1| - 3|x+2| + |x^2 + x - 2|$ is non differentiable at

(a) 2   (b) 3   (c) 4   (d) 0

41. Find the number of solutions of the equation $4(x-1) = \log_2(x-3)$

    (a) 0   (b) 1   (c) 2   (d) 4

42. Minimum value of $a^{a^x} + \dfrac{a}{a^{a^x}} \; (a > O; a, x \in R)$

    (a) $2\sqrt{a}$ (b) $\sqrt{2a}$ (c) $2\sqrt{2}a$ (d) $2\sqrt{2a}$

43. If 'x' is a number divided by '4', leaves the remainder '3', then find the remainder if $(2020 + x)^{2022}$ is divided by '8'

    (a) 1   (b) 2   (c) 3   (d) 4

44. If $x^3 - 2x^2 + 2x - 1 = 0$ has roots (α, β, γ) then find $(\alpha^{162} + \beta^{162} + \gamma^{162})$

    (a) 1   (b) 2   (c) 3   (d) 4

45. Find the area bounded by the curve $y = ||x-1|-2|$ with X-axis

    (a) 1   (b) 2   (c) 3   (d) 4

46. If a triangle is inscribed in a circle of radius r, then which of the following triangle can have maximum area:

    (a) Equilateral triangle with height $\dfrac{2r}{3}$ (b) Right angled triangle with side 2r, r

    (c) Equilateral triangle with side $\sqrt{3}r$ (d) Isosceles triangle with base 2r

47. From the point A(3, 2) a line is drawn to any point on the circle $x^2 + y^2 = 1$. If locus of midpoint of this line segment is a circle, then its radius is

    (a) $\dfrac{\sqrt{13}}{2}$ (b) $\dfrac{1}{2}$ (c) $\dfrac{\sqrt{11}}{2}$ (d) $\dfrac{1}{4}$

48. If slope of common tangent to curves $4x^2 + 9y^2 = 36$ and $4x^2 + 4y^2 = 31$ is m, then m² is equal to:

    (a) 3   (b) 6   (c) 9   (d) 5

49. If A and B are matrices of same order, then $(AB' - BA')$ is a

    (a) Skew-symmetric matrix   (b) Null matrix   (c) Symmetric matrix   (d) Unit matrix

50. The set $(A \cap B')' \cup (B \cap C)$ is equal to

    (a) $(A' \cup B \cup C)$ (b) $(A' \cup B)$ (c) $(A' \cup C')$ (d) $(A' \cap B)$

51. Choose the most appropriate options to fill in the blanks as follows.

Every human being, after the first few days of his life, is a product of two factors:

on the one hand, there is his .... endowment; and on the other hand, there is the effect of environment, including ....

(a) constitutional; weather   (b) Congenital; education

(c) Personal; climate   (d) Economic; learning

52. Choose the most appropriate options to fill in the blanks as follows.

The .... of public awareness about the disease has led to its widespread ....

(a) Dearth, incidence   (b) Paucity, occurrence (c) Lack, happening   (d) Scarcity, frequency

53. In the question below, a word **'File'** has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is **incorrect or inappropriate:**

File

(a) You will find the paper in the file under the chair.   (b) I need to file an insurance claim.

(c) The cadets were marching in a single file.   (d) When the parade was on, a soldier broke the file.

54. In the following sentence, parts of the sentence are left blank. Beneath each sentence four different ways of completing the sentence are indicated. Choose the best alternative:

Sentence: Police .... notorious gangster after relentless chase that .... for 3 weeks.

(a) Arrest, reigned   (b) nabbed, lasted   (c) Snatched, persist   (d) contempt, endured

55. In the following sentence, parts of the sentence are left blank. Beneath each sentence, four different ways of completing the sentence are indicated. Choose the best alternative:

Sentence: An interview is a good chance to .... how candidates .... difficult situations.

(a) Discuss, improved   (b) Assess, addressed   (c) Analyze, tackling   (d) Evaluate, approach

56. In the question below, a word **'Run'** has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate:

I. I must run fast to catch up with him.

II. Our team scored a goal against the run of play.

III. You can't run over him like that

IV. The newly released book is enjoying a popular run.

(a) I and II only   (b) II and IV Only   (c) III only   (d) IV Only

57. The word **'Concurrence'** similar in meaning to the following words except:

(a) Agreement   (b) Accord   (c) Consensus   (d) Harmony

58. Select the word from the choices given below that is most similar in meaning to the word **'SOLITUDE'**.

(a) Musical Composition   (b) Aloneness   (c) True statement   (d) Single-mindedness

59. Which is the antonym of the word **'EXODUS'**

(a) Influx   (b) Return   (c) Home Coming   (d) Restoration

60. Choose the alternative from the following options, which can be substituted for the given words/sentence.

'A style in which a writer makes display of his knowledge'

(a) Ornate   (b) Pedantic   (c) Artificial   (d) Showy

61. A ten-rupee coin is placed on a plain paper. How many coins of the same size can be placed around it so that each one touches the central and adjacent coins?

(a) 4   (b) 7   (c) 3   (d) 6

62. The missing tcnn in the sequence ADVENTURE, DVENTURE, DVENTUR, ...?........, VENTU

(a) DVENT   (b) VENTURE   (c) VENTUR   (d) DVENTU

63. Choose the ODD ONE OUT:

(a) Rice   (b) Maize   (c) Jower   (d) Wheat

64. If DRIVER = 12. PEDESTRIAN= 20, ACCIDENT = 16, then CAR = ?

(a) 3   (b) 6   (c) 8   (d) 0

65. If you are facing north-cast and move 10 m forward, turn left and move 7.5 m, then you are:

(a) North of your initial position   (b) South of your initial position

(c) East of your initial position   (d) West of your initial position

66. A clock is so placed that at 12 noon its minute hand point towards north-east. In which direction does its hour hand point at 01:30 p.m.?

(a) North   (b) South   (c) East   (d) West

67. A frog tries to come out of a dried well 900m deep with slippery walls. Every time the frog jumps up 60 cm, he slides back 30 cm. How many jumps the frog will have to take to come out of the well?

(a) 29   (b) 30   (c) 25   (d) 26

68. In how many ways a cricketer can hit a century if he hits only fours and sixes?

(a) 24   (b) 12   (c) 9   (d) 8

69. How many times are the hands of a clock at right angles in a day?

(a) 24   (b) 48   (c) 22   (d) 44

70. Find the missing term in the series: 2, 15, 4, 12, 6, 7, ..., ...?

(a) 8, 8   (b) 8, 0   (c) 3, 8   (d) 4, 8

71. A is B's sister, C is B's mother, D is C's father, E is D's mother. Then how is A related to D?

(a) Grandmother   (b) Grandmother   (c) Daughter   (d) Grand daughter

72. Find the wrong number in the series given below: 5, 18, 34, 54, 79, 110, 158

(a) 34   (b) 54   (c) 18   (d) 158

73. Find the wrong number in the series given below: 5, 6, 14, 45, 184, 920, 5556

(a) 5   (b) 6   (c) 920   (d) 5556

74. Win is related to Competition in the same way as invention is related to:

(a) Product   (b) Discovery   (c) Trial   (d) Laboratory

75. Pointing towards a girl in the picture, Sarita said. "She is. the mother of Neha whose father is my son". How is Sarita related to the girl in the picture?

(a) Mother   (b) Mother-in-law   (c) Aunt   (d) Sister

76. If 100 cats kill 100 mice in 100 days, then 4 cats would kill 4 mice in how many days?

(a) 1 day   (b) 4 days   (c) 40 days   (d) 100 days

77. Two pipes A and B can fill a tank in 12 minutes and 16 minutes respectively. If both pipes are opened together, then after how much time B should be closed so that the tank gets filled in 9 minutes.

(a) 2 minutes   (b) 4 minutes   (c) 8 minutes   (d) 12 minutes

78. If Mathematics : Logic : : Science : ?

(a) Facts   (b) Scientist   (c) Experiment   (d) Laboratory

79. Five children take part in a tournament. Each one has to play every other one. How many games must they play?

(a) 8   (b) 10   (c) 24   (d) 30

80. A man has a certain number of small boxes to pack into parcels. If he packs 3, 4, 5 or 6 in a parcel, he is left with one over; if he packs 7 in a parcel none is left over. What is the number of boxes, he may have to pack?

(a) 106   (b) 301   (c) 309   (d) 400

81. Which of the following statements best explains a process?

(a) It is a program   (b) It is a program in execution

(c) It is an instance of a program in execution   (d) It is a program that uses system calls

82. Files that store data in the same format as used in the program are called.

(a) Binary files   (b) Source file   (c) Text files   (d) Core Files

83. Mach List- I and List -II and select correct group of matching.

	List - I	List - II
1.	DOS	P. Sun Microsystems
2.	P4	Q. Microsoft Corporation
3.	Java	R. IBM
4.	PC	S. Intel Corporation

(a) (1, Q), (2, S), (3, P), (4, R)   (b) (1, Q), (2, R), (3, S), (4, P)

(c) (1, S), (2, P), (3, Q), (4, R)   (d) (1, R), (2, P), (3, Q, (4, S)

84. Which of the following languages is case sensitive?

(a) FORTRAN   (b) BASIC   (c) C   (d) None

85. Kernel is:

(a) Considered as the critical part of of OS

(b) The software which monitors the OS

(c) The set of primitive functions upon which rest of the OS functions are built

(d) None

86. If $(123)_5 = (A3)_B$, then the number of possible values of A is:

    (a) 4 (b) 1 (c) 3 (d) 2

87. The three main components of a digital computer system are:

    (a) Memory, I / O, DMA (b) ALU, CPU, Memory

    (c) Memory, CPU, I / O (d) Control Circuits, ALU, Registers

88. The Boolean expression $AB + AB' + A'C + AC$ is unaffected by the value of the Boolean variable:

    (a) A (b) B (c) C (d) none

89. The method of communication in which transmission takes place in both the direction, but only in one direction at a time is called:

    (a) Simplex (b) Four wire circuit (c) Full duplex (d) Half duplex

90. The Topology with the highest reliability is:

    (a) Bus Topology (b) Star Topology (c) Ring Topology (d) Mesh Topology

91. C is a:

    (a) High level language (b) Low level language

    (c) High Level language with some low level features (d) Low level language with some high level features

92. Match List-I and List-II given below and select the correct answer from the given options.

List – I		**List - II**	
1.	Azim Premji	P.	Microsoft
2.	Narayana Murthy	Q.	Wipro
3.	Bill Gates.	R.	Satyam
4.	Ramalinga Raju	S.	Infosys

    (a) (1, S), (2, Q, (3, P), (4, R) (b) (1, Q), (2, S), (3, P), (4, R)

    (c) (1, P), (2, R), (3, S), (4, Q) (d) (1, S), (2, P), (3, Q), (4, R)

93. The minimum number of temporary variables needed to swap the contents of two variables is:

    (a) 1 (b) 2 (c) 3 (d) 0

94. Binary equivalent of decimal number $(0.4375)_{10}$ is:

    (a) $(0.0111)_2$ (b) $(0.1011)_2$ (c) $(0.1100)_2$ (d) $(0.1010)_2$

95. An important aspect in coding is:

    (a) Readability (b) To use as small memory space as possible

    (c) Productivity (d) Brevity

96. C++ was originally developed by

    (a) Clocksin and Mellish (b) Donald E. Knuth (c) Sir Richard Hadlee (d) Bjarne Stroustrup

97. Who created the first free e-mail service on the internet:

    (a) B.W. Kernighan (b) Bill gates (c) N. Karmakar (d) Sabeer Bhatia

98. In general, for a computer which of the following represents the memories in increasing order of their capacities?

(a) Register < RAM < Cache < Hard Disk   (b) RAM < Cache < Hard Disk < Register

(c) Register < Cache < RAM < Hard Disk   (d) Cache < RAM < Hard Disk < Register

99. In IPv4, the length of an IP address is.

(a) 16 bits   (b) 32 bits   (c) 48 bits   (d) 64 bits

100. Which Protocol is used to send messages from a mail client to a mail server?

(a) FTP   (b) IP   (c) SMTP   (d) TCP / IP