

SCHOOL OF MATHEMATICAL SCIENCES

Bachelor in Mathematical Science (B.Math.Sc.)

Model Question for Entrance Examination

2073

Full Marks: 100

Time: 2:00 Hours

Attempt all questions.

Section - I: MATHEMATICS

- If $A = \{1, 4, 6, 7\}$, $B = \{2, 4, 5, 7\}$, then $A \Delta B$ is
a) $\{1, 2\}$ b) $\{5, 6\}$ c) $\{1, 2, 3, 6\}$ d) $\{1, 2, 5, 6\}$
- Which one is not true?
a) $(A \cap B) \cap C = A \cap (B \cap C)$ b) $A \cap \phi = \phi$ c) $(A \cup B) \cup C = A \cup (B \cup C)$ d) $\overline{A \cap B} = \overline{A} \cap \overline{B}$
- If $\sqrt{x+iy} = a+ib$, then the value of $\sqrt{x-iy}$ is
a) $(a^2 + b^2)^2$ b) $x - iy$ c) $a - ib$ d) $a + ib$
- Let $A = \{a, b\}$, $B = \{1\}$. Then the set of all relations from A to B is
a) $\{(a, 1), (b, 1)\}$ b) $\{(a, 1)\}, \{(b, 1)\}$ c) $\{(a, 1)\}$ d) $\{(b, 1)\}$
- If the function f is defined by $f(x) = x^5 - 1$, then $f^{-1}(x) =$
a) $1/(\sqrt[5]{x+1})$ b) $1/\sqrt[5]{x+1}$ c) $\sqrt[5]{x-1}$ d) $\sqrt[5]{x+1}$
- If $x+2$, $3x$ and $4x+1$ are in A.P., then the value of x is
a) 3 b) 2 c) $3x+1$ d) none
- The number of bacteria in a certain culture doubles every hour. If there were 3 bacteria present in the culture originally, then the number of bacteria at the end of 10^{th} hour is
a) 3072 b) 200 c) 3000 d) none
- The slope of the line determined by the equation $3x + y = 4$ is
a) -3 b) $1/3$ c) $3/4$ d) 3
- Let A , B and C be three matrices that are conformable for multiplication. Which of the following is false?
a) $AB \neq BA$ b) $A \cdot (BC) = (AB) \cdot C$ c) $AB = BA$ d) $A(B+C) = AB+AC$
- The statement "If x is divisible by 8, then it is divisible by 6" is false if x equals
a) 6 b) 14 c) 32 d) 48
- In a class of 50 students, 18 take music, 26 take art, and 2 take both art and music. How many students in the class are not enrolled in either music or art?
a) 6 b) 8 c) 16 d) 10
- If the statement "If Tom buys a red skateboard, then Amanda buys green in-line skates" is true, which of the following is true?
a) If Amanda does not buy green in-line skates, then Tom does not buy a red skateboard
b) If Tom does not buy a red skateboard, then Amanda does not buy green in-line skates
c) If Amanda buys green in-line skates, then Tom buys a red skateboard
d) If Tom buys a red skateboard, then Amanda does not buy green in-line skates

13. The sentence " ____ if and only if $x + x = 3x$ " is TRUE. Which of the following could be used to fill in the blank?
- a) $x + x = 2x$ b) $2x - x = 2x$
 c) both 1 and 2 could be used d) neither 1 nor 2 could be used
14. When $y = 3$, which of the following is FALSE?
- a) y is prime and y is odd b) y is odd or y is even
 c) y is not prime and y is odd d) y is odd and $2y$ is even
15. The solution set of the following system of inequalities
- $$\begin{aligned} x - y &> 1 \\ y &< 2x - 1 \end{aligned}$$
- contains the point
- a) $(-1, -1)$ b) $(3, 1)$ c) $(0, -1)$ d) $(0, -2)$
16. What is the value of n when ${}^n P_3 = 60$?
- a) 4 b) 5 c) 20 d) 60
17. A school committee consists of 2 teachers and 4 students. The number of different committees that can be formed from 5 teachers and 10 students is
- a) 10 b) 15 c) 2100 d) 8
18. The angle between the vector $2\vec{i} - 3\vec{j} + 4\vec{k}$ and $-3\vec{i} - 4\vec{j} - \frac{3}{2}\vec{k}$ is
- a) 0° b) 90° c) 60° d) 30°
19. For what value of k will the equation $(k + 1)x^2 + 2(k + 3)x + 2k + 3 = 0$ have equal roots?
- a) $-2, 13$ b) $2, 3$ c) $-2, 3$ d) $-2, 1$
20. The three solutions of the equation $f(x) = 0$ are $-2, 0$, and 3 . Therefore, the three solutions of the equation $f(x - 2) = 0$ are
- a) $-4, -2$, and 1 b) $-2, 0$ and 3 c) $4, 2$, and 5 d) $0, 2$ and 5
21. Rekha wants to hang four equal sized square pictures on her wall. Her mom says it's O.K., but she has to use the absolute minimum number of tacks to hang them. Rekha insists that she must put one tack in each corner of each photo. What is the smallest number of tacks Louise needs?
- a) 4 b) 8 c) 9 d) 16
22. 18% of the students at a school are in Year 8, and 16% of the students are in Year 9. If the school has 126 students of 8 year old, the number of students of 9 year old is
- a) 108 b) 110 c) 112 d) 114
23. The exam scores of all 500 students were recorded and it was determined that these scores were normally distributed. If Amar's score is 0.8 standard deviation above the mean, then how many, to the nearest unit, students scored above Amar?
- a) 394 b) 250 c) 400 d) 106
24. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?
- a) 6.25 b) 6.5 c) 6.75 d) 7

25. In a dairy farm, 40 cows eat 40 bags of husk in 40 days. In how many days one cow will eat one bag of husk?
 a) 1 b) 1/40 c) 40 d) 80
26. If 7 spiders make 7 webs in 7 days, then 1 spider will make 1 web in how many days?
 a) 1 b) 7/2 c) 7 d) 49
27. Reena took a loan of Rs. 1200 with simple interest for as many years as the rate of interest. If she paid Rs. 432 as interest at the end of the loan period, what was the rate of interest?
 a) 3.6 b) 6 c) 18 d) Cannot be determined
28. $\left(\frac{1}{2}\right)\left(\frac{5}{6}\right)\left(\frac{8}{5}\right) =$
 a) $\frac{5}{12}$ b) $\frac{1}{2}$ c) $\frac{2}{3}$ d) $\frac{4}{3}$
29. If $5^a = 3125$, then the value of $5^{(a-3)}$ is
 a) 25 b) 125 c) 625 d) 1625
30. A homeowner is planning to use carpet tiles to cover the floor of a room measuring 9 feet by 10 feet 8 inches. If the carpet tiles are 8 inches wide and 1 foot long and there are no gaps between the tiles as they are placed on the floor, how many carpet tiles will the homeowner need to cover the floor of the room?
 a) 100 b) 135 c) 144 d) 150
31. Seats for Mathematics, Computer and Statistics in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
 a) 2 : 3 : 4 b) 6 : 7 : 8 c) 6 : 8 : 9 d) None of these
32. Look at the sequence: 7, 10, 8, 11, 9, 12, ... What number should come next?
 a) 7 b) 10 c) 12 d) 13
33. If $\frac{1}{2}x$ years ago Adam was 12, and $\frac{1}{2}x$ years from now he will be $2x$ years old, how old will he be $3x$ years from now?
 a) 18 b) 24 c) 30 d) 54
34. If $6x + 5 = -x + 40$, then
 a) $x = -9$ b) $x = -5$ c) $x = 5$ d) $x = 9$
35. The set of all points (e^t, t) , where t is a real number, is the graph of $y =$
 a) $1/e^t$ b) $e^{1/t}$ c) $te^{1/t}$ d) $\ln t$
36. The chance that A can solve a certain problem is $2/3$ and the chance that B can solve it is $3/4$. The chance that the problem would be solved by at least one of them is
 a) $11/12$ b) $1/12$ c) $1/2$ d) $12/11$
37. When a metallic ball bearing is placed inside a cylindrical container, of radius 2 cm, the height of the water, inside the container, increases by 0.6 cm. The radius, to the nearest tenth of a centimeter, of the ball bearing is
 a) 1 cm b) 1.2 cm c) 2 cm d) 0.6 cm
38. A merchant in Nepal buys goods in London to the value of £1000. When the rate of exchange between India and Nepal is Rs.1.6 for Rs.1 IC and between London and India is £20 for Rs.1690 IC, the value of the goods in NC is
 a) 0.057 b) 135200 c) 1352 d) 13520
39. The list price of an article is 25% above the selling price. And the cost price is 40% below the list price. Find the rate of discount.
 a) 10% b) 20% c) 30% d) 25%

40. $\lim_{x \rightarrow 32} \frac{x^{1/5} - 2}{x - 32} =$

- a) 2 b) $\frac{1}{80}$ c) $-\frac{1}{80}$ d) 32

41. A function $f(x)$ is defined as follows:

$$f(x) = \begin{cases} \frac{x^2 - 2x}{x - 2} & x \neq 2 \\ k & x = 2 \end{cases}$$

the value of k so that the function $f(x)$ is continuous at $x = 2$ is

- a) 3 b) 2 c) 5 d) none

42. If $y = 2t^2 + t + 3$ and $t = x(x^2 + 3)$, then $\frac{dy}{dx}$ is

- a) $(4x^3 + 12x + 1)(3x^2 + 3)$ b) $3x^2 + 3$ c) $4x^3 + 12x + 1$ d) none

43. If $y = \ln \ln \sqrt{x}$, then $\frac{dy}{dx}$ is

- a) $\frac{3}{x}$ b) $\ln \sqrt{x}$ c) $\frac{1}{x \ln x}$ d) none

44. A gardner having 120 metres of fencing wishes to enclose a rectangular plot of land and also to erect a fence across the land parallel to two of the sides. The maximum area he can enclose is

- a) 600 m^2 b) 500 m^2 c) 1600 m^2 d) 900 m^2

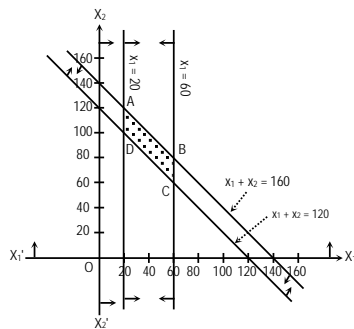
45. $\int \frac{3x^2 - 2}{e^{5(x^3 - 2x + 5)}} dx =$

- a) $-\frac{1}{5 e^{5(x^3 - 2x + 5)}}$ b) $-\frac{1}{2(3x^2 - 7x + 5)^2} + C$ c) $-\frac{1}{5 e^{5(x^3 - 2x + 5)}} + C$ d) none

46. $\int_0^1 x^3 \sqrt{1 + 2x^4} dx =$

- a) $\frac{1}{12}$ b) $\frac{1}{12}(3\sqrt{3})$ c) $(3\sqrt{3} - 1)$ d) $\frac{1}{12} (3\sqrt{3} - 1)$

47. Vertices of the shaded region are



- a) $(20, 120), (60, 80), (60, 60), (20, 100)$ b) $(0, 120)$ and $(120, 0)$
 c) $(0, 140), (140, 0).$ d) $(0, 120), (120, 0), (0, 140), (140, 0).$

48. Which of the following is correct?

- a) Mode = Median – Mean b) Mode = 3 Median – 2 Mean
 c) Mode = 2 Median – 3 Mean d) Mode = 3 Median + 2 Mean

49. If $n = 10, \Sigma x = 120, \Sigma x^2 = 1530$, then the coefficient of variation is

- a) 12% b) 3 c) 25% d) 25

61. My television setwhile I was watching a match.
 a) broke up b) broke down c) broke into d) broke out
62. I don't know anything, and she doesn't.....
 a) neither b) too c) either d) none of them
63. Wisdom is a gift.....heaven.
 a) of b) from c) to d) into
64. The meeting was.....till next Monday.
 a) put by b) put through c) put in d) put off
65. I have.....the picture, which you gifted me, in my bedroom.
 a) hung b) hang c) hanged d) hunged
66. In the forest, some men weredown trees.
 a) falling b) fallen c) felling d) fell
67. Money paid after the completion of a work is called.....
 a) remuneration b) renovation c) palimony d) alimony
68. I couldn't help..... when my boss slipped on a banana skin.
 a) laugh b) laughing c) laughed d) laughingly
69. Choose the correct passive voice of "I saw him conducting the assembly."
 a) He was seen conducting the assembly b) I saw the assembly being conducted
 c) I conducting the assembly saw him d) The assembly was being conducted
70. Tick the correct indirect speech for the sentence: The students said, "Let us go home early sir."
 a) The students suggested going home early. b) The students requested him to let them go home early.
 c) The students requested him to go home early. d) The students requested he went home early.
71. The Children are usually gentle but today they are pillow fighting on.....bed
 a) a b) an c) the d) nothing
72. I the project work by next weekend
 a) will be doing b) will have been doing c) will have done d) will do
73. Ten days.....not enough for this project.
 a) is b) are c) were d) have
74. What is the collective noun for a group of wolves?
 a) pack b) deck c) mob d) gang
75. Choose the word which is most OPPOSITE in meaning to "RELINQUISH"
 a) Conquer b) Attack c) Assume d) Withdraw

Section - III: General Knowledge and IQ.

76. Who was Oliver Cromwell?
 a) an Economist b) a scientist c) a leader in the Civil War of England d) a Chemist
77. Who was Confucius?
 a) a Chinese president b) a Chinese prime Minister c) a Chinese painter d) a Chinese Philosopher
78. Which of the following canals joins the Atlantic with the Pacific Ocean
 a) Suez b) Panama c) Alize d) None of these
79. Where is the Headquarter of UNESCO?
 a) New York b) Montreal c) Nairobi d) Paris

80. -----is known for small-incision cataract surgery.
 a) Sanduk Ruit b) Mahabir Pun c) Ramesh Chokhani d) BhagawanKoirala
81. Who started copper coins in Nepal?
 a) Mahendra Malla b) Ratna Malla c) Anshu Barma d) Bir Shamsher
82. Which bank in Nepal has the slogan "Your Bank at Your Service"?
 a) Nabil Bank b) Siddhartha Bank c) Everest Bank d) Kumari Bank
83. If the currency of Indonesia is called **Rupiah**, what is the currency of Czechoslovakia called
 a) Riyal b) Koruna c) Frank d) Takka
84. Which company's slogan is "let's make things better"?
 a) General Electronics b) Philips c) BPL d) Tata
85. With which of the trade name "gulf" is associated?
 a) computer b) soft drink c) cigarette d) lube oil
86. Which of the following is not a news agency?
 a) PTI b) RSS c) ILO d) UNI
87. Which sports man is popularly known as "sultan of reverse swing"?
 a) Javed Miandad b) Wasim Akram c) Shoeb Akhtar d) Wakar Younis
88. Which animal is portrayed in the Nepalese rupee twenty-five note?
 a) Tiger b) Elephant c) Cow d) Musk deer
89. Which of the following is the Science dealing with crop plants?
 a) Astronomy b) Astrology c) Agronomy d) Agrology
90. 'JKLM' is related to 'XYZA' in the same way as 'NOPQ' is related to—
 a) RSTU b) YZAB c) DEFG d) BCDE
91. (?) is related to Masculine in the same way Woman is related to ?
 a) Disguise, Modest b) Capacity, Woman c) Man, Feminine d) Brave, Mrs.
92. Which one of the following is same as red, yellow, blue?
 a) Sky b) Dark c) Green d) Bright
93. Which one of the following is same as carpenter, plumber, electrician?
 a) Doctor b) Blacksmith c) Teacher d) Lawyer
94. Find out the alternative whose two words have the same relation as in the two words below:
Malaria : Mosquito
 a) Poison : Death b) Rat : Plague c) Epidemic : Bacteria d) Cholera : Water
95. Find out the alternative whose two words have the same relation as in the two words below:
Water : Thirst
 a) Food : Hunger b) Sun : Energy c) Appetite : Meal d) Poison : Death
96. Introducing a man, a woman says, "He is the only son of my mother's mother." How is the man related to the woman?
 a) Uncle b) Father c) Maternal uncle d) None of these
97. The day after the day after tomorrow is four days before Monday. What day is it today?
 a) Monday b) Tuesday c) Wednesday d) Thursday
98. If there are six sisters in a family each with one brother. How many children are there in the family?
 a) 7 b) 11 c) 12 d) 14

99. At a conference, 12 members shook hands with each other before and after the meeting. How many total number of hand shakes occurred?
 a) 100 b) 132 c) 145 d) 144
100. If the word MANAKAMANA is written as AAAAA, then what will be the code for GORAKHNATH?
 a) OAHAT b) GAKAH c) OAHAH d) OAHAT

Answers Key

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|-------|--------|-------|-------|-------|-------|-------|
| 1. d | 2. d | 3. c | 4. a | 5. d | 6. a | 7. a |
| 8. a | 9. c | 10. c | 11. b | 12. a | 13. b | 14. c |
| 15. b | 16. b | 17. c | 18. b | 19. c | 20. a | 21. c |
| 22. c | 23. d | 24. a | 25. c | 26. c | 27. b | 28. c |
| 29. a | 30. c | 31. a | 32. b | 33. d | 34. b | 35. d |
| 36. a | 37. b | 38. b | 39. b | 40. b | 41. a | 42. a |
| 43. c | 44. a | 45. c | 46. d | 47. a | 48. b | 49. c |
| 50. d | 51. d | 52. b | 53. c | 54. b | 55. d | 56. d |
| 57. c | 58. d | 59. c | 60. d | 61. b | 62. c | 63. a |
| 64. d | 65. a | 66. c | 67. a | 68. b | 69. a | 70. b |
| 71. c | 72. c | 73. a | 74. a | 75. c | 76. c | 77. d |
| 78. b | 79. a | 80. a | 81. b | 82. a | 83. b | 84. b |
| 85. d | 86. c | 87. d | 88. c | 89. c | 90. d | 91. c |
| 92. c | 93. b | 94. d | 95. a | 96. c | 97. a | 98. a |
| 99. b | 100. c | | | | | |