

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

ANNUAL EXAMINATIONS 2022

General Mathematics

Time: 1 hour 40 minutes Marks: 50

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 50 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

Correct Way	Incorrect Ways
1 (A) (B) ● (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. The marks obtained on the 50 MCQs will be equated to the total marks of 75 for the theory examination results.
8. You may use a simple calculator if you wish.

1. The distance between two towns X and Y is 75 km. A family is travelling from town X to town Y and has covered a distance of 20 km from town X . The percentage of remaining distance to town Y is
 - A. 26.67%.
 - B. 55.00%.
 - C. 73.33%.
 - D. 136.36%.

2. Zahida paid *zakat* of Rs 13,500 on annual savings. Her annual saving is
(**Note:** Rate of *zakat* is 2.5%.)
 - A. Rs 54,000
 - B. Rs 54,500
 - C. Rs 540,000
 - D. Rs 545,000

3. Mr Habib owns a property worth Rs 8,250,000. His legal heirs include two sons and two daughters, where the share of a son is two times that of a daughter. The share of each daughter is
 - A. Rs 1,175,000
 - B. Rs 1,375,000
 - C. Rs 2,062,500
 - D. Rs 2,750,000

4. Flowers are distributed between two friends, Asma and Khalida, in the ratio 5:7. If Asma gets 35 flowers, then the number of flowers Khalida will get is
 - A. 25
 - B. 35
 - C. 49
 - D. 63

5. Sajid reads 25 pages of a book in 55 minutes. At the same pace, if he reads 65 pages of the same book, then time consumed will be
 - A. 29.5 minutes.
 - B. 59.5 minutes.
 - C. 77 minutes.
 - D. 143 minutes.

6. On converting $\frac{2}{3}\%$ of $\frac{3}{2}$ into fraction, we get

A. $\frac{9}{400}$.

B. $\frac{4}{900}$.

C. $\frac{6}{100}$.

D. $\frac{1}{100}$.

7. If p varies directly as the square of \sqrt{q} , then the relationship can be expressed as

A. $p \propto q$.

B. $p \propto \frac{1}{q^2}$.

C. $p \propto \sqrt{q}$.

D. $p \propto \frac{1}{\sqrt{q}}$.

8. If 36% is expressed as a fraction, it would be

A. $\frac{9}{50}$.

B. $\frac{12}{50}$.

C. $\frac{9}{25}$.

D. $\frac{18}{25}$.

9. It takes 6 hours for 12 people to complete a task. How many people will complete the same task in 4 hours?

A. 6

B. 8

C. 14

D. 18

10. Sarah worked for 200 days in the year 2020. For the year, the percentage of the days she worked was

(Note: The year 2020 consisted of 366 days.)

- A. 10%.
- B. 54.64%.
- C. 65.66%.
- D. 182.5%.

11. The price of a book increased in a ratio of 6:5. If the original price of the book is Rs 240, then the increased price will be

- A. Rs 200
- B. Rs 248
- C. Rs 251
- D. Rs 288

12. All of the following are equivalent ratios of $\frac{5}{7}$ EXCEPT

- A. $\frac{25}{35}$.
- B. $\frac{45}{63}$.
- C. $\frac{10}{12}$.
- D. $\frac{10}{14}$.

13. Shazia purchased a house for Rs 2,500,000. After two years, she sold it at a profit of 30%. The selling price of the house is

- A. Rs 750,000
- B. Rs 3,250,000
- C. Rs 8,333,333.3
- D. Rs 10,833,333.3

14. In a summer sale, a super store reduced marked price of all the goods by 15%. If the marked price of a leather jacket was Rs 3,000, then its selling price will be

- A. Rs 2,500
- B. Rs 2,550
- C. Rs 3,450
- D. Rs 3,500

15. Sara bought 20 storybooks. The cost price of each storybook was Rs 200. If she sold 10 storybooks at a price of Rs 350 each and remaining 10 storybooks at Rs 150 each, then her

- A. loss was Rs 3,500
- B. loss was Rs 1,000
- C. profit was Rs 1,000
- D. profit was Rs 1,500

16. If Salman sold clothes for Rs 67,000 and gained a profit of Rs 5,500, then the cost price of the clothes will be
- A. Rs 61,500
 - B. Rs 62,500
 - C. Rs 72,500
 - D. Rs 73,500
17. Sana bought a car for Rs 600,000 and spent Rs 50,000 on its renovation. If she sold the car for Rs 750,000, then her profit percentage will be
- A. 13.33%.
 - B. 15.38%.
 - C. 80.00%.
 - D. 86.67%.
18. Sajid bought two trousers and two shirts. The tag price of each trouser and shirt is Rs 1,000 and Rs 500 respectively. If the discount offered on the tag price of the trouser and the shirt is 5% and 10% respectively, then the discounted price of two trousers will be
- A. Rs 100
 - B. Rs 950
 - C. Rs 1,800
 - D. Rs 1,900
19. In the expression $5 \times 5 \times 5 \times 5$, the base and the exponent respectively are
- A. 5 and 4
 - B. 5 and 1
 - C. 4 and 5
 - D. 1 and 5
20. On simplification of $\left(\frac{x^2}{x}\right)^{-2}$, we get
- A. $\frac{1}{x^2}$.
 - B. $\frac{1}{x^5}$.
 - C. $\frac{1}{x^4}$.
 - D. $\frac{1}{x}$.

21. In the given expression $\sqrt{4x}$, the radicand is
- A. 2
 - B. $\frac{1}{2}$
 - C. $4x$
 - D. $2x$
22. In the expression $\log_a 3 = \frac{1}{2}$, the value of a is equal to
- A. $\frac{1}{8}$
 - B. $\sqrt{3}$
 - C. 6
 - D. 9
23. On simplification of $\frac{x^0}{x^{-1}}$, we get
- A. 0
 - B. 1
 - C. x
 - D. $-x$
24. In scientific notation, the number 75,000 is equal to
- A. 7.5×10^3
 - B. 7.5×10^4
 - C. 75×10^3
 - D. 0.75×10^5
25. The logarithmic form of $a^b = c$ is
- A. $\log_a c = b$.
 - B. $\log_b a = c$.
 - C. $\log_c b = a$.
 - D. $\log_c a = b$.
26. In multiple logarithms, the expression $\log\left(\frac{x}{y}\right)^4$ can be written as
- A. $4\log x - 4\log y$.
 - B. $4\log x + 4\log y$.
 - C. $4\log x - \log y$.
 - D. $4\log(x - y)$.

27. For $\log_{\sqrt{5}} 5 = x$, the value of x is equal to

- A. -1
- B. -2
- C. 1
- D. 2

28. For $\log_4 x = 1$, the value of x is equal to

- A. 0
- B. 1
- C. 2
- D. 4

29. Which of the following algebraic expressions represents a polynomial?

- A. $x^2 - \sqrt{x} + 2$
- B. $x^2 - x + \sqrt{2}$
- C. $x^2 + \frac{1}{x} + \sqrt{2}$
- D. $x^{\frac{1}{2}} - x + \sqrt{2}$

30. In its lowest form, $\frac{6x^5}{2x^7}$ will become

- A. $3x^2$.
- B. $\frac{1}{3x^2}$.
- C. $\frac{3}{x^2}$.
- D. $3x^{12}$.

31. In the simplest form $\frac{\sqrt{12} + \sqrt{18}}{\sqrt{2}}$ is

- A. $\sqrt{15}$
- B. $\sqrt{6} + 3$
- C. $2\sqrt{3} + 3$
- D. $\sqrt{6} + 3\sqrt{2}$

32. The value of the expression $\frac{x^2+1}{x^3+1}$ at $x = 1$ is

- A. 0
- B. $\frac{2}{3}$
- C. $\frac{3}{4}$
- D. 1

33. On simplification of $\frac{x^2-x}{x+1} \times \frac{2x+2}{x^2-1}$, we get

- A. $\frac{2x}{x+1}$.
- B. $\frac{2x}{x-1}$.
- C. $\frac{2(x-1)}{x+1}$.
- D. $\frac{2(x-1)}{(x+1)^2}$.

34. If the value of $a+b=16$ and $2ab=126$, then the value of a^2+b^2 will be equal to

- A. 110
- B. 130
- C. 142
- D. 256

35. On complete factorisation of $3xy^2-9xyz+15axy$, we get

- A. $3xy(12a-6z)$.
- B. $3xy(1-3z+5a)$.
- C. $xy(3-9z+15a)$.
- D. $3(xy-3xyz+5axy)$.

36. On complete factorisation of $xy^2+xy-y-1$, we get

- A. $(xy-1)(y-1)$.
- B. $(xy+1)(y-1)$.
- C. $(xy-1)(y+1)$.
- D. $(xy+1)(1-y)$.

37. The zeros of the polynomial $(x+1)(2x-4)$ are

- A. -1 and 4
- B. 1 and -4
- C. -1 and 2
- D. 1 and -2

38. The factors of $4y^2 - 8y + 4$ are

- A. $2y - 2$ and $2y + 2$
- B. $2y - 1$ and $2y - 4$
- C. $2y - 2$ and $2y - 2$
- D. $2y + 1$ and $2y - 4$

39. The polynomial $x^2 - x - 30$ is equivalent to the product

- A. $(x - 6)(x + 5)$.
- B. $(x + 6)(x - 5)$.
- C. $(x - 6)(x - 5)$.
- D. $-(x + 6)(x + 5)$.

40. On dividing $2x^3 + 3x^2 - 3x$ by $x - 1$, the remainder is

- A. -3
- B. -2
- C. 2
- D. 3

41. Which of the following matrices is a symmetric matrix?

I. $\begin{bmatrix} 1 & 3 \\ 1 & 0 \end{bmatrix}$

II. $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

III. $\begin{bmatrix} 0 & 1 \\ 1 & 3 \end{bmatrix}$

- A. I only
- B. II only
- C. I and III
- D. II and III

42. If matrices $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then $A \times B$ is equal to

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

B. $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$.

C. $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$.

D. $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$.

43. If $A = \begin{bmatrix} 3x & 6 \\ 1 & -1 \end{bmatrix}$ and $|A| = 6$, then value of x will be

A. -4

B. -3

C. 3

D. 4

44. If $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $\begin{bmatrix} x & y \\ z & t \end{bmatrix}$ are multiplicative inverse of each other, then $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \times \begin{bmatrix} x & y \\ z & t \end{bmatrix}$ is

A. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$.

B. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

C. $\begin{bmatrix} ax & by \\ cz & dt \end{bmatrix}$.

D. $\begin{bmatrix} dt & -by \\ -cz & ax \end{bmatrix}$.

45. An example of a row matrix is

A. $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$.

B. $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$.

C. $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$.

D. $\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$.

46. It is given that $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & -2 \\ -1 & 0 \end{bmatrix}$. On simplification of $2B - C$, we get

- A. $\begin{bmatrix} 1 & -2 \\ 5 & -4 \end{bmatrix}$.
- B. $\begin{bmatrix} 2 & 2 \\ 5 & 8 \end{bmatrix}$.
- C. $\begin{bmatrix} 2 & 6 \\ 7 & 8 \end{bmatrix}$.
- D. $\begin{bmatrix} 2 & 8 \\ 8 & 8 \end{bmatrix}$.

47. It is given that $X = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, $Y = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ and $Z = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$.

For the given matrices, which of the following matrix multiplication is possible?

- A. $X \times X$
- B. $Y \times Y$
- C. $Z \times Z$
- D. $Z \times X$

48. For the matrices $X = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ and $Y = \begin{bmatrix} a & a \\ b & b \\ c & c \end{bmatrix}$, the matrix multiplication $X \times Y$ is equal to

- A. $\begin{bmatrix} a+b & a+c \\ a+b & a+c \end{bmatrix}$.
- B. $\begin{bmatrix} a+c & a+c \\ a+b & a+b \end{bmatrix}$.
- C. $\begin{bmatrix} a & a \\ 0 & 0 \\ c & 0 \end{bmatrix}$.
- D. $\begin{bmatrix} a & 0 & c \\ a & b & 0 \end{bmatrix}$.

49. For the matrix $\begin{bmatrix} a & 1 \\ -1 & b \end{bmatrix}$, the determinant is equal to

- A. $-1 - ab$
- B. $ab - 1$
- C. $ab + 1$
- D. $1 - ab$

50. The adjoint of the matrix $\begin{bmatrix} 3 & -1 \\ 3 & 2 \end{bmatrix}$ is

A. $\begin{bmatrix} 2 & -1 \\ 3 & 3 \end{bmatrix}$.

B. $\begin{bmatrix} 2 & 1 \\ -3 & 3 \end{bmatrix}$.

C. $\begin{bmatrix} -3 & -3 \\ 1 & -2 \end{bmatrix}$.

D. $\begin{bmatrix} -3 & -3 \\ -1 & -2 \end{bmatrix}$.

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