AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

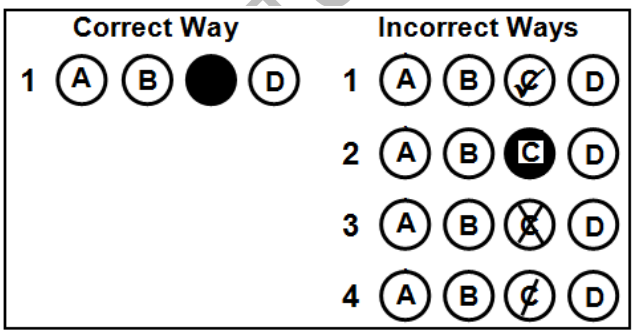
APRIL/ MAY 2019

Mathematics Paper I

Time: 50 minutes Marks: 35

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 35 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.



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. You may use a simple calculator if you wish.

1. Given that $A = \{a\}$ and $B = \{1, 2\}$, then $B - A$ is equal to

   A. $\{\ \}$
   B. $\{a\}$
   C. $\{1, 2\}$
   D. $\{1-a, 2-a\}$

2. If $U = \{1,2,3,4,5\}$ and $A \cup B = \{1,2,3,4\}$, then $A^c \cap B^c$ is equal to

   A. ϕ
   B. $\{5\}$
   C. $\{1,2,3,4\}$
   D. $\{1,2,3,4,5\}$

3. For the three non-empty sets *X*, *Y* and *Z*, the CORRECT option is

   A. $(X \cup Y) \cap Z = X \cup (Y \cap Z)$
   B. $(X \cup Y) \cup Z = X \cup (Y \cap Z)$
   C. $(X \cap Y) \cap Z = X \cap (Y \cup Z)$
   D. $(X \cup Y) \cup Z = X \cup (Y \cup Z)$

4. For a given binary relation $r = \{(a,a),(a,b),(b,c),(b,d)\}$, the range is

   A. $\{a,b\}$
   B. $\{a,b,c\}$
   C. $\{a,c,d\}$
   D. $\{a,b,c,d\}$

5. For the sets $A = \{a,e,i\}$ and $B = \{1,2,3,4\}$, the function from *A* to *B* will be

   A. $\{(a,1),(e,2)\}$
   B. $\{(a,1),(e,1),(i,1)\}$
   C. $\{(a,1),(a,2),(a,3),(a,4)\}$
   D. $\{(a,1),(e,2),(i,3),(a,4)\}$

6. If $2i + 3 = b + ai - 3i$, then the value of *a* will be

   A. -2
   B. -1
   C. 1
   D. 5

7. On simplification of $ai + ib - b - a$, we get

A. $(a+b)i - 1$
B. $(a+b)(i-1)$
C. $a - b + (a+b)i$
D. $(a-b)i + a + b$

8. Which of the following fractions is a terminating decimal fraction?

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

9. $\sqrt{\frac{a^2 \times b}{b^3}}$ is equal to

A. $\frac{a^2}{b^2}$
B. $\frac{a}{b}$
C. $\pm\frac{a}{b}$
D. $\pm ab^2$

10. If $5 \times 10^{-b} = 0.0500$, then b is equal to

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

11. The logarithmic form of $a^{-3} = \frac{1}{16}$ will be written as

A. $\log_a \frac{1}{16} = -3$
B. $\log_a 16 = -3$
C. $\log_{\frac{1}{16}} 3 = a$
D. $\log_3 \frac{1}{16} = -a$

12. The logarithmic expression $\frac{\log_3 x}{\log_3 y}$ can also be written as

A. $\log_x y$
B. $\log_y x$
C. $\log_3 \frac{x}{y}$
D. $\log_3 (x - y)$

13. For $a = -1$ and $b = -1$, the value of $a^2 - 2ab^2$ is equal to

A. -3
B. -1
C. 1
D. 3

14. The value of $a^2 + b^2$, when $(a+b)^2 = 81$ and $ab = 20$, is equal to

A. 41
B. 61
C. 81
D. 121

15. On simplification of $\frac{6+\sqrt{35}}{3-\sqrt{8}} \times \frac{6-\sqrt{35}}{3+\sqrt{8}}$, we get

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

16. In simplified form, $\frac{(x-1)^2}{x^2-1}$ is equal to

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

17. On complete factorisation of $9-(3a-b)^2$, we get

A. $(3+3a+b)(3+3a-b)$
B. $(3-3a+b)(3+3a-b)$
C. $(9-3a+b)(9+3a-b)$
D. $(9+3a+b)(9+3a-b)$

18. The factors of $x^2+2x+2xy+4y$ are

A. $3x$ and $(x+2y)$.
B. $3x$ and $(x+4y)$.
C. $(x+2)$ and $(x+4y)$.
D. $(x+2)$ and $(x+2y)$.

19. On complete factorisation of $2a^3-2$, we get

A. $2(a-1)(a^2+2a+1)$
B. $2(a-1)(a^2+a+1)$
C. $2(a-1)(a^2-a+1)$
D. $2(a-1)(a^2-2a+1)$

20. One of the factors of x^3+x^2-4x-4 is

A. x
B. $x-1$
C. $x+1$
D. $x+4$

21. For x^2-2x^3-3, one of the zeros of the given polynomial is

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

22. If $a : b = c : d$, then according to the invertendo property, we get

A. $b : a = d : c$
B. $a : b = d : c$
C. $b : a = c : d$
D. $a : c = b : d$

23. If numbers *k*, 5 and 25 are in continued proportion, then the value of k is

A. 1
B. 5
C. $\frac{1}{5}$
D. 125

24. The matrix $\begin{bmatrix}1 & 1 & 1\end{bmatrix}$ is a

I. unit matrix.
II. row matrix.
III. rectangular matrix.

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

25. The transpose of the matrix $\begin{bmatrix}2 & 3 & 1\\ 2 & 3 & 1\end{bmatrix}$ is

A. $\begin{bmatrix}2 & 1 & 3\\ 2 & 1 & 3\end{bmatrix}$
B. $\begin{bmatrix}1 & 3 & 2\\ 1 & 3 & 2\end{bmatrix}$
C. $\begin{bmatrix}2 & 2\\ 3 & 3\\ 1 & 1\end{bmatrix}$
D. $\begin{bmatrix}1 & 1\\ 3 & 3\\ 2 & 2\end{bmatrix}$

26. If $A = \begin{bmatrix}2 & 3\end{bmatrix}$ and $B = \begin{bmatrix}1\\ 5\end{bmatrix}$, then $A \times B$

A. is $\begin{bmatrix}17\end{bmatrix}$
B. is $\begin{bmatrix}2\\ 15\end{bmatrix}$
C. is $\begin{bmatrix}2 & 15\end{bmatrix}$
D. cannot be determined.

27. If $A = \begin{bmatrix} a & 18 \\ 2 & a \end{bmatrix}$ is a singular matrix, then the possible value(s) of a will be

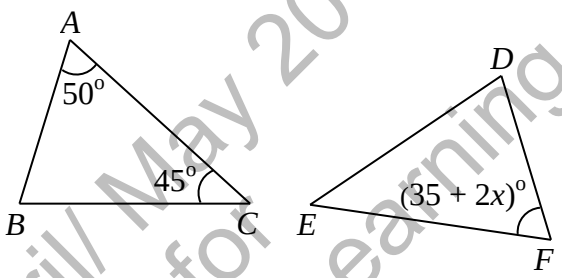
A. 0
B. ± 18
C. ± 6
D. 9

28. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then $|AdjA|$ will be

A. -10
B. -2
C. 2
D. 10

29. If $\Delta ABC \cong \Delta DFE$, then the value of x is equal to

A. 20^o
B. 25^o
C. 35^o
D. 50^o



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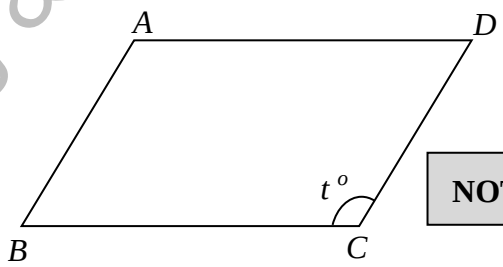
30. For the given parallelogram $ABCD$, the CORRECT option is

I. $\angle B = \angle C$
II. $|AB| = |CD|$
III. $\angle D = 180^o - t^o$

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



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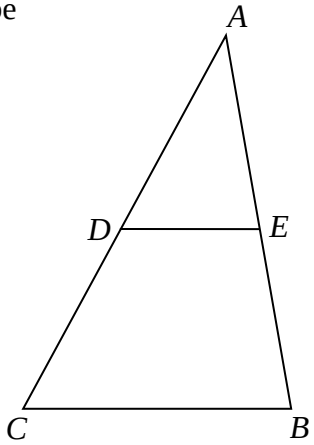
31. The given figure shows a triangle ABC, where D and E are the midpoints of sides AC and AB respectively. The CORRECT option will be

I. $AD = AE$
II. $DE = \frac{1}{2} BC$
III. DE is parallel to BC

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



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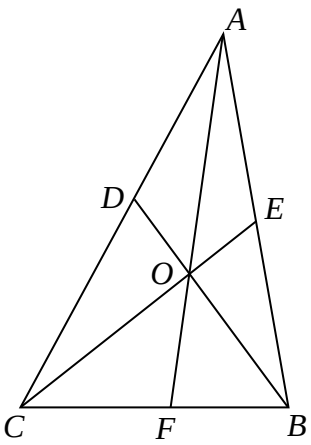
32. The given figure shows a triangle *ABC*. Its medians *AF*, *BD* and *CE* are intersecting at point *O*. If *AF* = 6 cm, then *OA* is equal to

A. 1 cm
B. 2 cm
C. 3 cm
D. 4 cm



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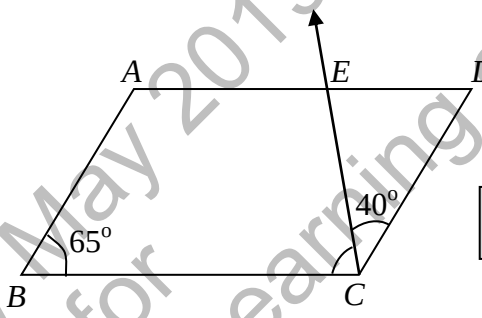
33. The given figure shows a parallelogram *ABCD*, the measurement of angle *BCE* is

A. 25^o
B. 75^o
C. 105^o
D. 115^o



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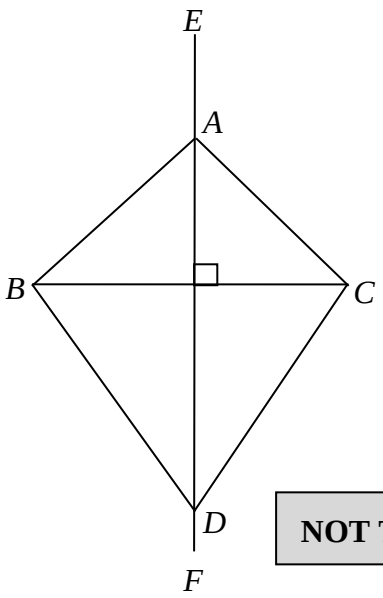
34. If *EF* is the right bisector of *BC*, then triangle *ABC* and triangle *DBC* are

A. scalene triangles.
B. isosceles triangles.
C. equilateral triangles.
D. right angled triangles.



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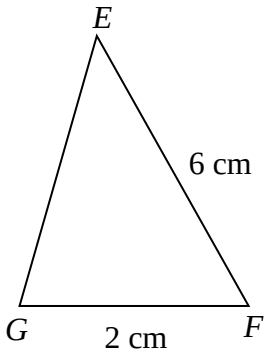
35. For the given triangle *EFG*, which of the following is TRUE?

A. $\angle F > \angle G$
B. $\angle G > \angle E$
C. $\angle E > \angle F$
D. $\angle G = \angle E + \angle F$



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