AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX

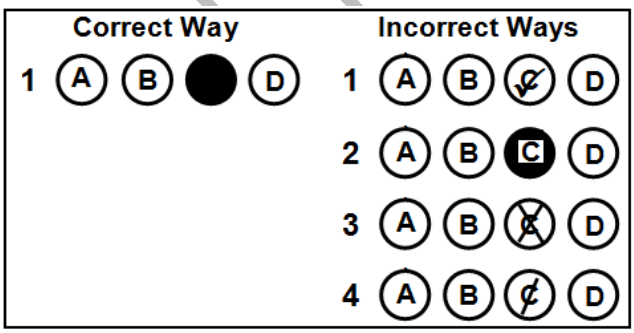
MODEL EXAMINATION PAPER 2018

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. Set A is defined as $A = \{1, 2, 3\}$. If $A \cup B = \{1, 2, 3, 4, 5\}$ and $A \cap B = \phi$, then set B is equal to

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

2. If $A = \{a, b\}$ and $B = \{10, 20\}$, then which of the following option(s) is/ are binary relation from A to B?

   I. $\{(a, 10), (b, 20)\}$
   II. $\{(10, a), (20, b)\}$
   III. $\{(a, 20)\}$
   IV. $\{(10, b)\}$

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

3. If a universal set is defined as $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and E is the set of even numbers, then E' is

   A. ϕ
   B. $\{1, 3, 5, 7, 9\}$
   C. $\{2, 4, 6, 8, 10\}$
   D. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

4. If $X = \{10, 20\}$ and $Y = \{p, q, r\}$, then which of the following represents a function from X to Y?

   A. $\{(10, p)\}$
   B. $\{(10, p), (10, q)\}$
   C. $\{(10, p), (20, p)\}$
   D. $\{(10, p), (10, q), (20, r)\}$

5. If $A = \{1, 2, 3, 4\}$ and $B = \{10, 20\}$, then which of the following is an into function from A to B?

   A. $\{(1, 10), (2, 20)\}$
   B. $\{(1, 10), (2, 10), (3, 10)\}$
   C. $\{(1, 10), (2, 10), (3, 10), (4, 10)\}$
   D. $\{(1, 10), (2, 10), (3, 20), (4, 20)\}$

6. On simplification, $\frac{x^2}{x^{-4}}$ becomes

A. $\frac{1}{x^2}$

B. $\frac{1}{x^6}$

C. x^2

D. x^6

7. If $p = \frac{11}{5}$ and $q + r = \frac{14}{5}$, then $(p + q) + r$ is equal to

A. $\frac{3}{5}$

B. $\frac{5}{2}$

C. 2

D. 5

8. If *p* and *q* are real numbers, and p^{-1} is the multiplicative inverse of *p*, then which of the following statements is FALSE?

(Note: $p \neq 0$**)**

A. $p \times q$ is a real number

B. $p \times q = q \times p$

C. $p \times p^{-1} = 0$

D. $p \times 1 = p$

9. $\sqrt{2^3}$ can also be expressed as

A. $2^{\frac{3}{2}}$

B. $2^{\frac{2}{3}}$

C. $8^{\frac{3}{2}}$

D. $8^{\frac{2}{3}}$

10. The exponential form of $\log_3 5 = 2x$ is

A. $3^{2x} = 5$

B. $5^{2x} = 3$

C. $(2x)^3 = 5$

D. $(2x)^5 = 3$

11. If $\log_6 x = 2$, then x is equal to

A. 3
B. 12
C. 36
D. 64

12. 5.67×10^{-3} is equal to

A. 5670
B. 56700
C. 0.00567
D. 0.000567

13. On rationalisation of $\frac{1}{2+\sqrt{3}}$, we get

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

14. $\frac{a^4-4a^2}{a^2-2a}$ is equal to

A. a^2+2a
B. a^2-2a
C. a^2+4a
D. a^2-4a

15. $2\left(\sqrt{2}+1\right)-3\sqrt{2}$ is equal to

A. $2+\sqrt{2}$
B. $2-\sqrt{2}$
C. $2+5\sqrt{2}$
D. $2-5\sqrt{2}$

16. $(a+2b+c)^2$ is equal to

A. $a^2+2b^2+c^2+2ab+2bc+2ca$
B. $a^2+4b^2+c^2+4ab+2bc+2ca$
C. $a^2+4b^2+c^2+4ab+4bc+2ca$
D. $a^2+2b^2+c^2+4ab+4bc+2ca$

17. $u^3 - 27v^3$ can also be expressed as

A. $(u+3v)(u^2 - uv + v^2)$
B. $(u-3v)(u^2 + uv + v^2)$
C. $(u+3v)(u^2 - 3uv + 9v^2)$
D. $(u-3v)(u^2 + 3uv + 9v^2)$

18. On factorisation of $25x^2 + 5ax + 10x + 2a$, we get

A. $(5x+a)(5x+2)$
B. $(5a+x)(5a+2)$
C. $(5x^2+a)(5x+2)$
D. $(5ax+a)(5ax+2)$

19. $8p^3 + 12p^2q + 6pq^2 + q^3$ can also be expressed as

A. $(2p)^3 + q^3$
B. $(2p+q)^3$
C. $(p+2q)^3$
D. $p^3 + 2q^3$

20. When $x^2 + kx - 1$ is divided by $x - 1$, the remainder is 2. The value of *k* is

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

21. $(t+2)^3$ can also be expressed as

A. $t^3 + 6t^2 + 12t + 8$
B. $t^3 - 6t^2 + 12t - 8$
C. $t^3 + 3t^2 + 3t + 8$
D. $t^3 - 3t^2 + 3t - 8$

22. If $a : b :: c : d$, then according to componendo property

A. $a+b : b :: c+d : d$
B. $a-b : b :: c-d : d$
C. $a+b : a :: c+d : c$
D. $a-b : a :: c-d : c$

23. Ali bought an efficient washing machine that saves 10 gallons of water per load. How many gallons of water will he save if he washes 15 loads of laundry?

A. 0.15
B. 1.5
C. 15
D. 150

24. If P is a 1×3 matrix and Q is a 3×1 matrix, then which of the following represents a matrix of order 1×1?

A. Q^2
B. P^2
C. PQ
D. QP

25. If $\begin{bmatrix} 2 & 3 \\ -3 & 0 \end{bmatrix} + Q = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$, then Q is equal to

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
B. $\begin{bmatrix} 0 & -3 \\ 3 & 2 \end{bmatrix}$
C. $\begin{bmatrix} 2 & 3 \\ -3 & 0 \end{bmatrix}$
D. $\begin{bmatrix} -2 & -3 \\ 3 & 0 \end{bmatrix}$

26. The determinant of the matrix $\begin{bmatrix} 5 & -3 \\ 1 & 2 \end{bmatrix}$ is equal to

A. 3
B. 7
C. 10
D. 13

27. For any three matrices P, Q and R, the order of matrix P and Q is 2 × 4 and 4 × 3 respectively. If $R = P \times Q$, then the order of matrix R is

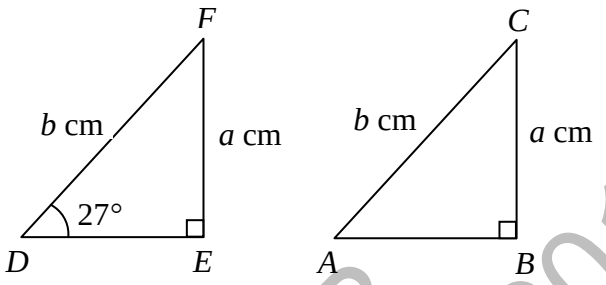
A. 2 × 3
B. 3 × 2
C. 4 × 3
D. 4 × 4

28. For a non-singular matrix A, $\left(A \times A^{-1}\right) \times A$ is equal to

(**Note**: I is the identity matrix and 0 is the null matrix.)

A. 0
B. I
C. A
D. A^{-1}

29. For the given two triangles ABC and DEF, $\angle C$ is equal to



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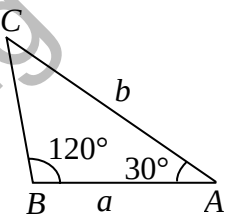
A. 27°
B. 33°
C. 63°
D. 67°

30. In the given triangle ABC, the side BC is equal to

A. $b - a$
B. a
C. $2a$
D. $\frac{b+a}{2}$



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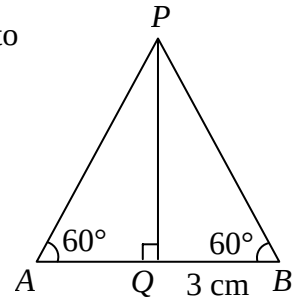
31. In the given diagram, the side AB is equal to

A. 3 cm
B. 4 cm
C. 6 cm
D. 7 cm



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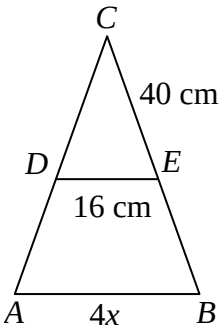
32. In the given diagram, D and E are the midpoints of the sides AC and BC respectively. If $AB = 4x$, $DE = 16$ cm and $EC = 40$ cm, then the value of x is equal to

A. 8 cm
B. 12 cm
C. 16 cm
D. 32 cm



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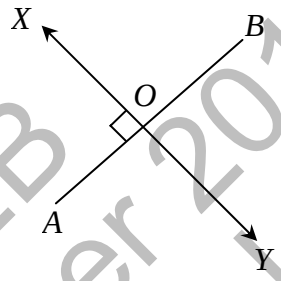
33. In the given diagram, the line XY bisects the line segment AB. If the length of AB is a cm, then the length of OA is equal to

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



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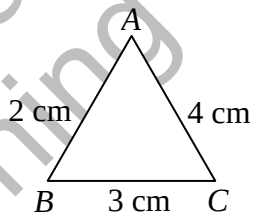
34. For the given triangle ABC, which one of the following is TRUE?

A. $m\angle C < m\angle A < m\angle B$
B. $m\angle B < m\angle A < m\angle C$
C. $m\angle A < m\angle B < m\angle C$
D. $m\angle C < m\angle B < m\angle A$



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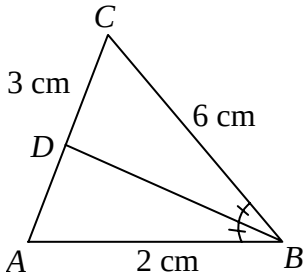
35. In the following figure, BD is the angle bisector of $\angle ABC$. If $AB = 2$ cm, $BC = 6$ cm, and $CD = 3$ cm, then the length of AD is

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



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