AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

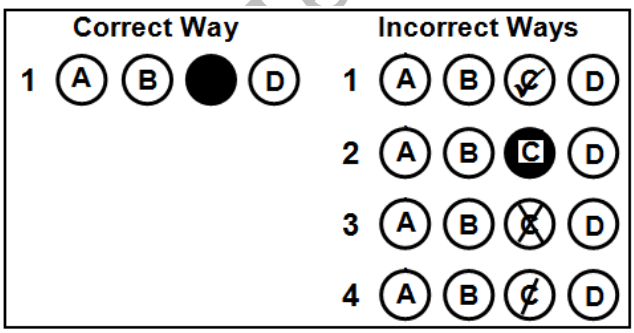
APRIL/ MAY 2018

Mathematics Paper I

Time: 40 minutes Marks: 30

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

   A. $\frac{1}{x^2}$
   B. $\frac{1}{x^6}$
   C. x^2
   D. x^6

2. 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

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

   A. $p \times q$ is a real number
   B. $p \times q = q \times p$
   C. $p \times p^{-1} = 0$
   D. $p \times 1 = p$

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

   A. $2^{\frac{3}{2}}$
   B. $2^{\frac{2}{3}}$
   C. $8^{\frac{3}{2}}$
   D. $8^{\frac{2}{3}}$

5. 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}

6. 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

7. 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. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

8. 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. $\{(10, p), (10, q), (20, r)\}$

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

A. $3^{2x} = 5$
B. $5^{2x} = 3$
C. $(2x)^3 = 5$
D. $(2x)^5 = 3$

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

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

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

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

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

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

13. $2\left(\sqrt{2}+1\right)-3\sqrt{2}$ is equal to

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

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

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

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

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

16. $8p^3+12p^2q+6pq^2+q^3$ can also be expressed as

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

17. 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. $a-b:a::c-d:c$

18. 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

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

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

20. 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. $\begin{bmatrix} -2 & -3 \\ 3 & 0 \end{bmatrix}$

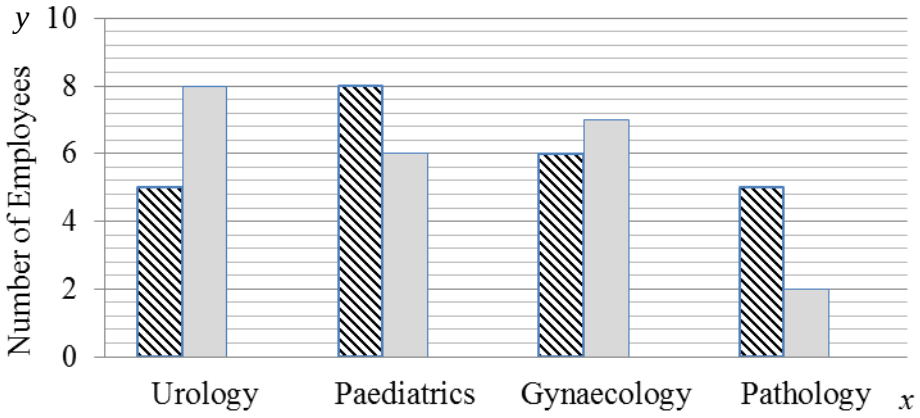
21. The determinant of the matrix $\begin{bmatrix} 5 & -3 \\ 1 & 2 \end{bmatrix}$ is equal to

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

22. The ages (in years) of nine children in a group are 4, 7, 8, 9, 6, 10, 5, 8 and 10. The median age is

A. 6
B. 7
C. 8
D. 10

The given bar chart shows the number of employees hired by a hospital in various departments in the years 2015 and 2016.



Using the given information, answer Q.23 and Q.24.

23. In Paediatrics department, the percentage change shows that hiring in 2016 as compared to last year has

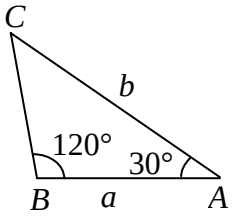
A. decreased by 25%
B. decreased by 33%
C. increased by 25%
D. increased by 33%

24. The number of employees hired in 2016 are

A. 4
B. 5
C. 23
D. 24

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

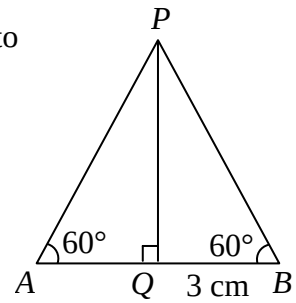
A. $b-a$
B. a
C. $2a$
D. $\frac{b+a}{2}$



NOT TO SCALE

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

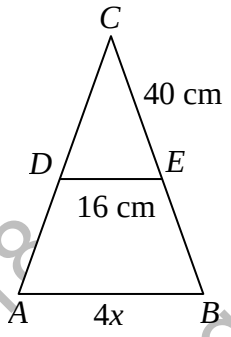
A. 3 cm
B. 4 cm
C. 6 cm
D. 7 cm



NOT TO SCALE

27. 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

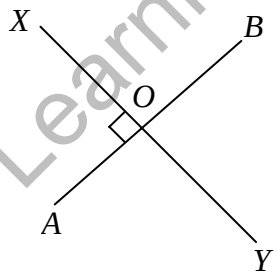
A. 8 cm
B. 12 cm
C. 16 cm
D. 32 cm



NOT TO SCALE

28. 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

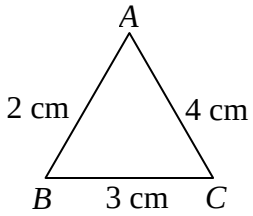
A. a
B. $\frac{a}{2}$
C. a^2
D. $2a$



NOT TO SCALE

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

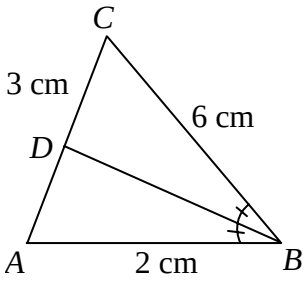
A. $m\angle C < m\angle A < m\angle B$
B. $m\angle B < m\angle A < m\angle C$
C. $m\angle A < m\angle B < m\angle C$
D. $m\angle C < m\angle B < m\angle A$



NOT TO SCALE

30. 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



NOT TO SCALE

END OF PAPER

Please use this page for rough work

Please use this page for rough work

Please use this page for rough work

Please use this page for rough work

Please use this page for rough work