

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS IX EXAMINATION**

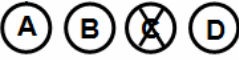
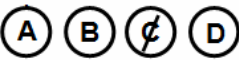
**MAY 2015**

**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.

| Correct Way |                                                                                     | Incorrect Ways |                                                                                     |
|-------------|-------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|
| 1           |  | 1              |  |
|             |                                                                                     | 2              |  |
|             |                                                                                     | 3              |  |
|             |                                                                                     | 4              |  |

**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. The imaginary part of  $-i(4i + 5)$  is

[Note:  $i = \sqrt{-1}$ ]

- A. 5
- B. 4
- C. -4
- D. -5

2. If  $z = -i$ , the value of  $(z \cdot \bar{z})$  will be

- A. 1
- B. -1
- C.  $\sqrt{-1}$
- D.  $-\sqrt{-1}$

3.  $\frac{(-a-2)^2}{(-a-2)^3}$  is equal to

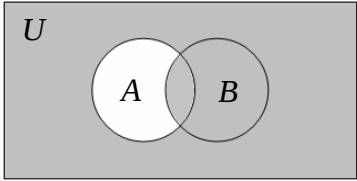
- A.  $(a+2)$
- B.  $-(a+2)$
- C.  $-\frac{1}{a+2}$
- D.  $-\frac{1}{a-2}$

4.  $\left(\frac{4}{9}\right)^{-\frac{1}{2}}$  is equal to

- A.  $\left(-\frac{2}{3}\right)$
- B.  $\left(-\frac{3}{2}\right)$
- C.  $\left(\frac{2}{3}\right)$
- D.  $\left(\frac{3}{2}\right)$

5. If  $X = \{0\}$  and  $Y = \{\}$ ,  $X \times Y$  is equal to

- A.  $\{\}$
- B.  $\{0\}$
- C.  $\{\{\}\}$
- D.  $\{(0, \{\})\}$

6. Which of the following can be an ordered pair of the relation  $R = \{(x, y) \mid y = x^3\}$ ?
- $(8, 2)$
  - $(1, 3)$
  - $(3, 27)$
- I only
  - III only
  - I and II
  - II and III
7. If  $f = \{(2, a), (3, c)\}$  is a function from  $A$  to  $B$ , where  $A = \{2, 3\}$  and  $B = \{a, b, c\}$ ,  $f$  is an
- into function only.
  - onto function only.
  - into and one-one function.
  - onto and one-one function.
8. The shaded region in the given Venn diagram represents
- $A^c$
  - $B^c$
  - $(A - B)^c$
  - $(B - A)^c$
- 
9.  $\log_3 5 + \log_3 2 - \log_3 10$  is equal to
- 3
  - 1
  - 0
  - 3
10. Given that  $\log 2 = 0.301$ ,  $\log 20$  is equal to
- 0.301
  - 1.301
  - 2.301
  - 3.301
11.  $\frac{2a^4}{3(b+1)^2} \times 6(b+1)^2$  is equal to
- $2a^4$
  - $4a^4$
  - $4a^2(b+1)^2$
  - $2a^4(b+1)^2$

12.  $2\sqrt{5} + 3\sqrt{5} - \sqrt{5}$  is equal to

- A.  $\sqrt{5}$
- B.  $2\sqrt{5}$
- C.  $4\sqrt{5}$
- D.  $5\sqrt{5}$

13. If a polynomial is defined as  $P(x) = 12$ ,  $P(10)$  is equal to

- A. 1
- B. 2
- C. 10
- D. 12

14. Factorized form of  $-6x^2 - 10x$  is

- A.  $2x(3x - 5)$
- B.  $-2x(3x - 5)$
- C.  $-2x(3x + 5)$
- D.  $2x(3x + 5)$

15. Which one of the following is a factor of  $x^3 + 2x^2 + x + 2$ ?

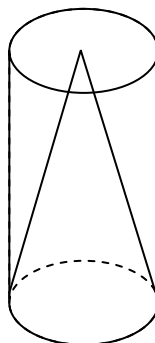
- A.  $x$
- B.  $x - 1$
- C.  $x + 1$
- D.  $x + 2$

16. If the expression  $a^4 - 4a^2 - b$  is a perfect square, the value of  $b$  is

- A.  $-4$
- B.  $-2$
- C.  $2$
- D.  $4$

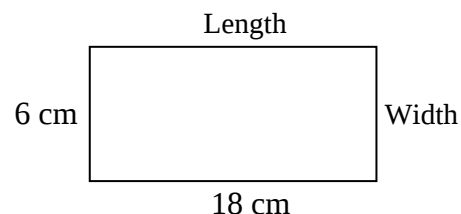
17. For equal radii, the ratio of volumes of a cone and a cylinder is 1: 3. If volume of the cylinder is  $6 \text{ cm}^3$ , then the volume of cone of same radius is

- A.  $2 \text{ cm}^3$
- B.  $9 \text{ cm}^3$
- C.  $18 \text{ cm}^3$
- D.  $27 \text{ cm}^3$



18. The length and width of a rectangle are shown in the figure. The ratio of width to length is

- A. 1 : 4
- B. 1 : 3
- C. 3 : 1
- D. 4 : 1



19. If two matrices  $A$  and  $B$  are defined as  $A = \begin{bmatrix} x \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 3 \end{bmatrix}$ ,  $A \times B$  is

- A.  $\begin{bmatrix} 2x & 3x \end{bmatrix}$
- B.  $\begin{bmatrix} 2x + 3x \end{bmatrix}$
- C.  $\begin{bmatrix} 2x \\ 3x \end{bmatrix}$
- D. not possible

20. If  $X = \begin{bmatrix} 1 & 0 \\ 2 & 3 \end{bmatrix}$  and  $Y$  is the additive inverse of  $X$ ,  $X - Y$  is equal to

- A.  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
- B.  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
- C.  $\begin{bmatrix} 2 & 0 \\ 4 & 6 \end{bmatrix}$
- D.  $\begin{bmatrix} -2 & 0 \\ -4 & -6 \end{bmatrix}$

21. If  $P = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$  and  $Q = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ ,  $P \times Q^t$  is equal to

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

22. The average of 6 numbers is 10. If one of the numbers is 5, then what is the average of the remaining 5 numbers?

A. 10  
B. 11  
C. 12  
D. 13

23. According to the following table, how many students obtained more than 30 marks?

| Marks obtained | Number of Students |
|----------------|--------------------|
| 11 – 20        | 3                  |
| 21 – 30        | 7                  |
| 31 – 40        | 15                 |
| 41 – 50        | 8                  |

A. 8  
B. 10  
C. 15  
D. 23

24. The following data represent the number of students absent in a class for 8 consecutive days.

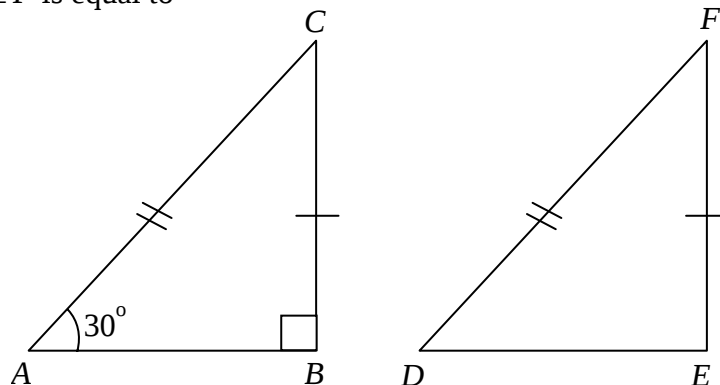
6, 6, 8, 5, 6, 7, 8, 7

The median of the number of students absent is

A. 5  
B. 5.5  
C. 6  
D. 6.5

25. If  $\triangle ABC \cong \triangle DEF$ ,  $m\angle F$  is equal to

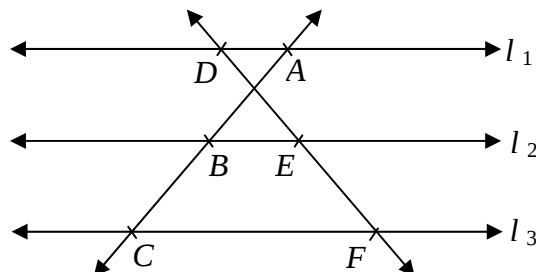
A.  $90^\circ$   
B.  $60^\circ$   
C.  $30^\circ$   
D.  $20^\circ$



NOT TO SCALE

26. In the given figure,  $l_1$ ,  $l_2$  and  $l_3$  are three parallel lines. If  $m\overline{AB} = m\overline{BC} = 3\text{ cm}$  and  $m\overline{EF} = 4\text{ cm}$ , then  $m\overline{DE}$  is equal to

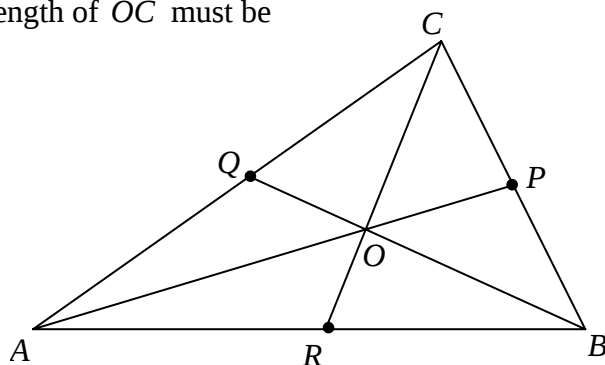
- A. 7 cm  
B. 4 cm  
C. 3 cm  
D. 2 cm



NOT TO SCALE

27. In the given triangle  $ABC$ ,  $\overline{AP}$ ,  $\overline{BQ}$  and  $\overline{CR}$  are the medians intersecting at point  $O$ , such that  $m\overline{RO} = a$ . The length of  $\overline{OC}$  must be

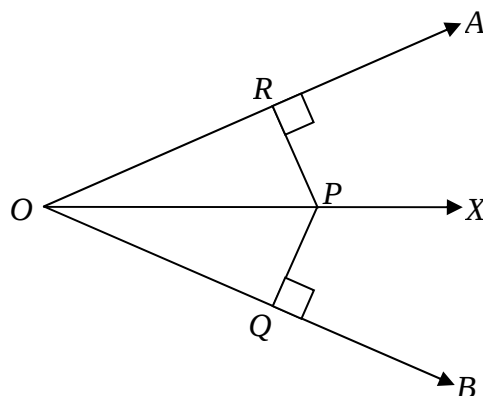
- A.  $\frac{2}{3}a$   
B.  $\frac{3}{2}a$   
C.  $2a$   
D.  $3a$



NOT TO SCALE

28. In the given figure,  $\overline{OX}$  is the angle bisector of  $\angle AOB$ . If  $m\overline{PQ} = 3\text{ cm}$ , then  $m\overline{PR}$  is

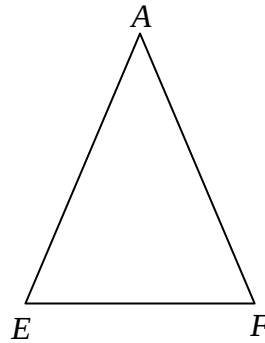
- A. 2 cm  
B. 3 cm  
C. 4 cm  
D. 6 cm



NOT TO SCALE

29. For the given triangle  $AEF$ , which of the following options is correct?

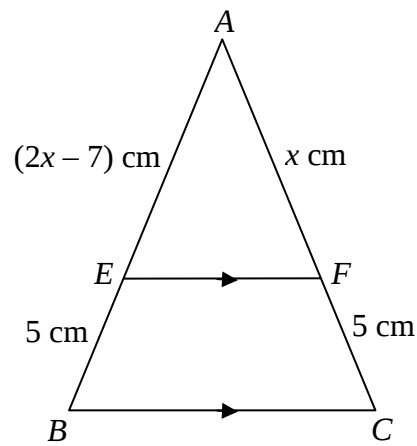
- A.  $m\overline{AE} + m\overline{AF} = m\overline{EF}$
- B.  $m\overline{AE} + m\overline{AF} < m\overline{EF}$
- C.  $m\overline{AE} + m\overline{AF} \geq m\overline{EF}$
- D.  $m\overline{AE} + m\overline{AF} > m\overline{EF}$



NOT TO SCALE

30. In the given figure  $\overline{EF}$  is parallel to  $\overline{BC}$ . The length of  $\overline{AC}$  is equal to

- A. 5 cm
- B. 7 cm
- C. 12 cm
- D. 14 cm



NOT TO SCALE