

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**SECONDARY SCHOOL CERTIFICATE**

**CLASS X**

**MODEL EXAMINATION PAPER 2020**

**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.

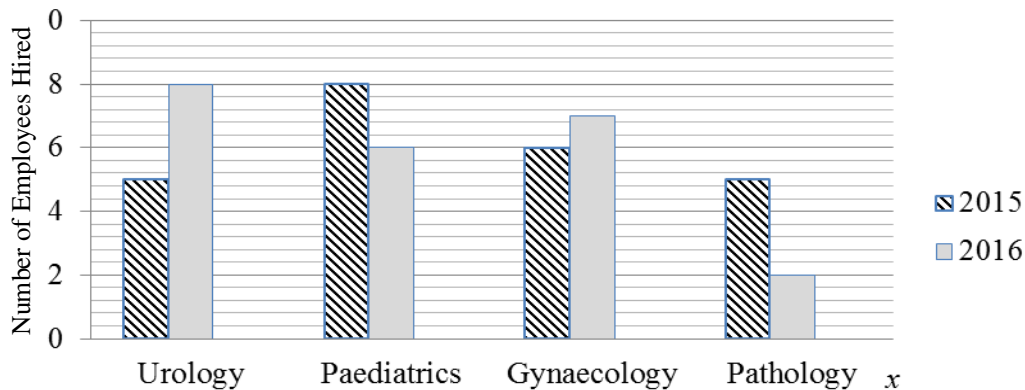
Correct Way		Incorrect Ways	
1		1	
		2	
		3	
		4	

**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 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.



Use the given information to answer Q.2 and Q.3.

2. 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%
3. The number of employees hired in 2016 are
  - A. 4
  - B. 5
  - C. 23
  - D. 24
4. For a set of ungrouped data,  $\bar{X} = 56.8$  and  $\frac{\sum X^2}{n} = 3268.80$ . The variance of the data is
  - A. 6.52
  - B. 32.12
  - C. 42.56
  - D. 56.67

5. The value of  $b$ , when  $\sqrt{ax^2 + bx + 64} = \pm 4(x+2)$ , will be
- 64
  - 32
  - 4
  - 2
6.  $45x^2$  is the least common multiple (LCM) of
- $3x^2$  and  $15x$
  - $3x$  and  $15x$
  - $5x^2$  and  $9x$
  - $5x$  and  $9x$
7.  $(\sqrt{x}-4) \div (x-4^2) \times (\sqrt{x}+4)$  is equal to
- 1
  - $\frac{1}{4}$
  - $\sqrt{x}+4$
  - $\frac{\sqrt{x}+4}{\sqrt{x}-4}$
8. Which of the following forms is suitable for the partial fraction of  $\frac{5x+3}{(x-2)(x+3)}$ ?
- $\frac{A}{(x-2)} + \frac{B}{(x+3)}$
  - $\frac{A+B}{(x-2)(x+3)}$
  - $\frac{A}{(x-2)} + \frac{Bx+C}{(x+3)}$
  - $\frac{Ax+B}{(x-2)} + \frac{C}{(x+3)}$
9.  $\frac{b+c}{2} - \frac{b+c}{3}$  is equal to
- $-\frac{b+c}{6}$
  - $-\frac{b+5c}{6}$
  - $\frac{b+c}{6}$
  - $\frac{b+5c}{6}$

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10. Which of the following fractions is a proper fraction?

(Note:  $x \neq a$  and  $b$ )

A.  $\frac{(x-b)^4}{(x-a)^2(x-b)}$

B.  $\frac{(x-b)^3}{(x-a)^2(x-b)}$

C.  $\frac{(x-a)^3}{(x-a)^2(x-b)}$

D.  $\frac{(x-a)^2}{(x-a)^2(x-b)}$

11. The solution set of  $\frac{x-1}{2} = 0$  is

A.  $\{-1\}$

B.  $\{-3\}$

C.  $\{3\}$

D.  $\{1\}$

12. Given that  $|-x| = -1$ , the solution set which must satisfy the equation is

A.  $\{-1\}$

B.  $\{ \}$

C.  $\{1\}$

D.  $\{\emptyset\}$

13. The inequality which BEST describes  $m(x-1) > m$ , where  $m$  is a natural number, will be

A.  $x < 1$

B.  $x < 2$

C.  $x > 1$

D.  $x > 2$

14. If  $x$  is a negative number, then the mathematical statement which must be TRUE is

A.  $-x \leq 0$

B.  $-x \geq 0$

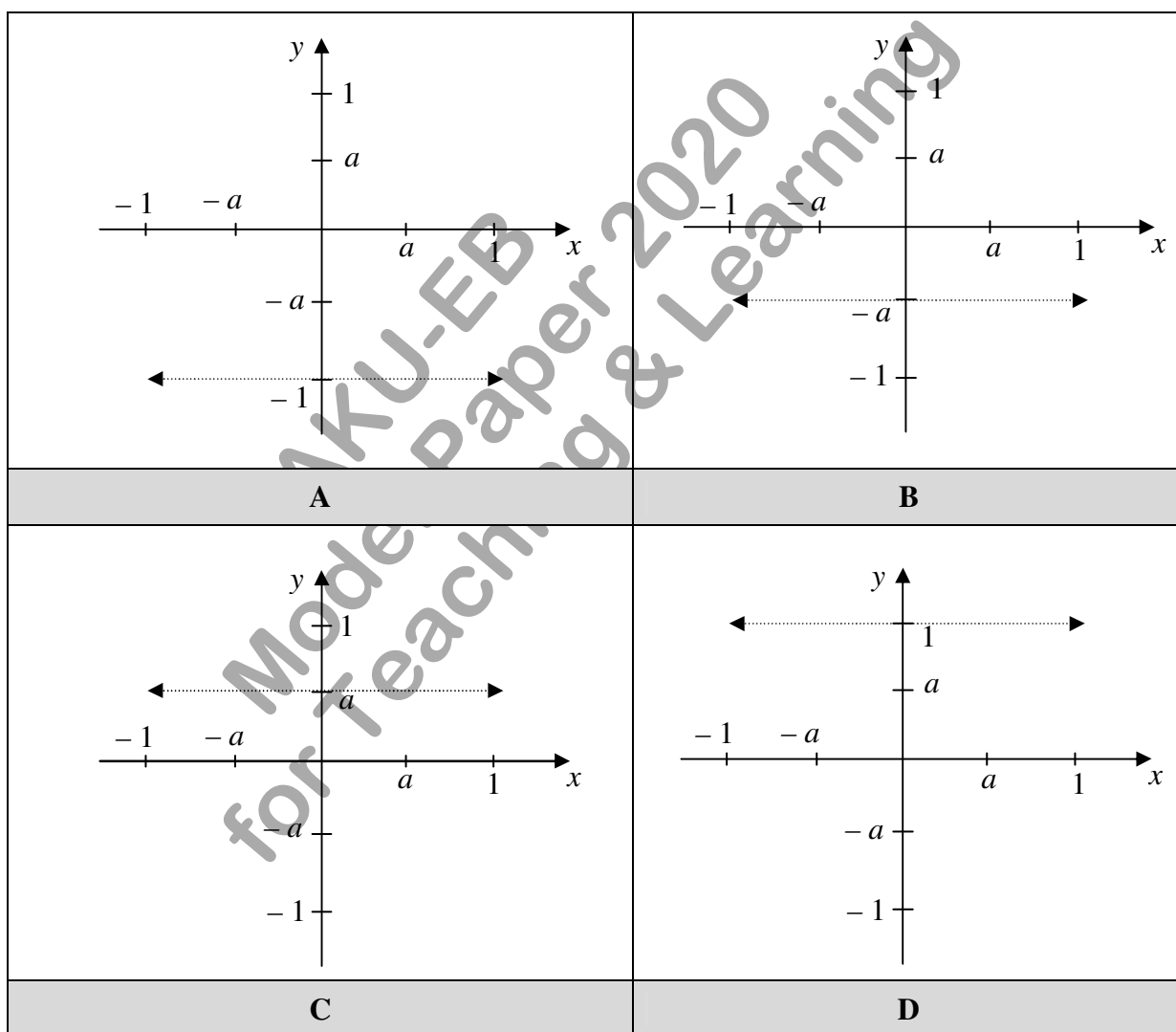
C.  $x < 0$

D.  $x > 0$

15. The linear equation which satisfies the given pairs of values as shown in the given table will be

$X$	2	-1
$Y$	-1	2

- A.  $Y = 1 - X$   
 B.  $Y = X - 1$   
 C.  $Y - 1 = X$   
 D.  $Y = -1 - X$
16. The correct graphical representation of  $ay + a = 0$  is



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17. The given graph represents straight line(s)

I.  $2y = -(2x + 2c)$

II.  $y = -x - c$

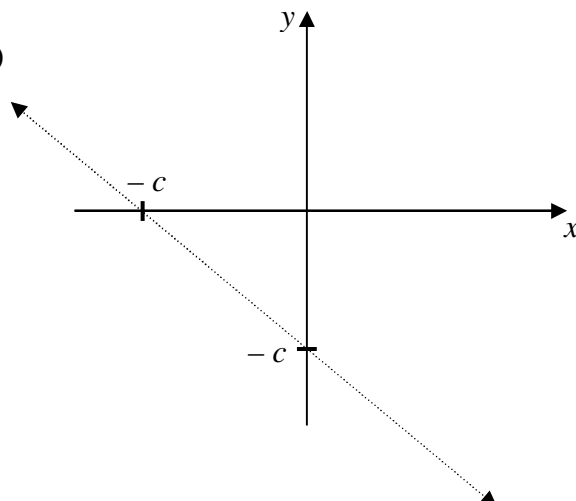
III.  $2y = x - c$

A. I and III.

B. I and II.

C. III only.

D. II only.



18. The quadratic equation that gives real and equal roots will be

A.  $x^2 + 4x + 3 = 0$

B.  $x^2 - 2x + 3 = 0$

C.  $2x^2 + 4x + 3 = 0$

D.  $2x^2 - 4x + 3 = 0$

19. When four times of a number  $x$  is squared, then the result will be half of one less than that number. The given statement can be written mathematically as

A.  $16x^2 = \frac{1}{2}(x-1)$

B.  $4x^2 = \frac{1}{2}(x-1)$

C.  $16x^2 = \frac{1}{2}x - 1$

D.  $4x^2 = \frac{1}{2}x - 1$

20. Which of the following equation(s) is same as  $2x^2 - 1 = 0$ ?

(Note:  $x \neq 0$ )

I.  $3 - \left(\frac{1}{x^2} + 1\right) = 0$

II.  $2(x^2 - 1) = 0$

III.  $\frac{1}{x} - 2x = 0$

A. II only

B. III only

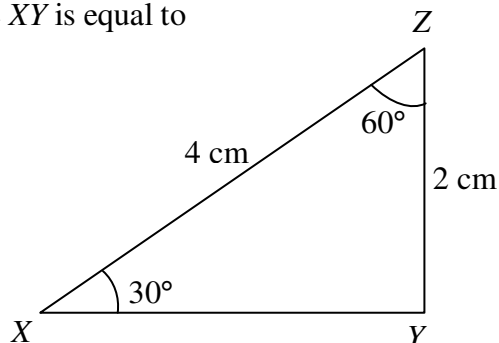
C. I and II

D. I and III

21. The valid condition for the distance between two points  $(a, b)$  and  $(c, d)$  will be
- $(a - c)^2 + (b - d)^2 \geq 0$
  - $(b - a)^2 + (d - c)^2 \geq 0$
  - $(a - c)^2 + (b - d)^2 < 0$
  - $(b - a)^2 + (d - c)^2 < 0$
22. Which of the following points is collinear with the points  $(x, y)$  and  $(x - 1, y)$ ?
- $(x + 1, y + 1)$
  - $(x - 1, y - 1)$
  - $(x + 1, y)$
  - $(x, y + 1)$
23.  $1\frac{1}{4}$  rotation in anticlockwise direction is equal to
- $90^\circ$
  - $270^\circ$
  - $288^\circ$
  - $450^\circ$
24. If the central angle measured in radians is  $\alpha + 2$  and the length of circular arc is  $3\pi$  of radius  $r$ , then the value of  $\alpha$  is equal to
- $3\pi + 2$
  - $3\pi - 2$
  - $\frac{3\pi}{2}$
  - $3\pi$

25. In the given triangle XYZ, side XY is equal to

- 2 cm
- $2\sqrt{3}$  cm
- 3 cm
- 4 cm



NOT TO SCALE

26. For  $A=45^\circ$ , the value of  $(\sin A + \cos A)^2$  is equal to

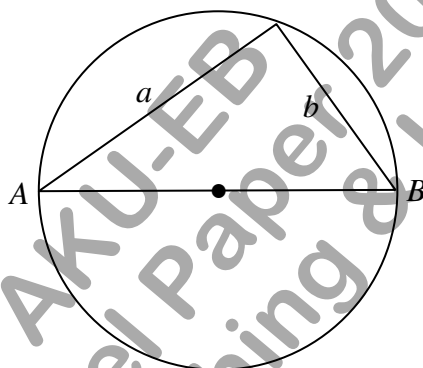
- A. 1
- B. 2
- C.  $\frac{1}{2}$
- D.  $\frac{1}{4}$

27. Which of the following lengths do NOT form a right angled triangle?

- A.  $3\sqrt{2}$ ,  $4\sqrt{2}$  and  $5\sqrt{2}$
- B. 6, 8 and 10
- C. 5, 5 and 10
- D. 3, 4 and 5

28. In the given diagram, if the diameter of the circle is  $AB$ , then radius of the circle, in terms of  $a$  and  $b$ , will be

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



NOT TO SCALE

29. If the length of the sides of a right angled triangle are  $k$ ,  $l$  and  $m$  such that  $l < k < m$ , then according to Pythagoras' theorem

- A.  $m^2 = k^2 - l^2$
- B.  $l^2 = (k + m)^2$
- C.  $m^2 = (k + l)^2$
- D.  $l^2 = m^2 - k^2$

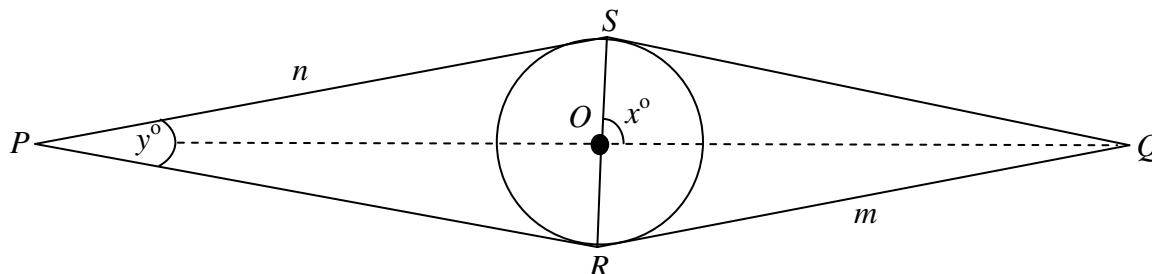
30.  $\frac{\sin^2 \theta}{1 - \sin^2 \theta}$  is equal to

- A.  $-\tan^2 \theta$
- B.  $\cot^2 \theta$
- C.  $-\cot^2 \theta$
- D.  $\tan^2 \theta$



Use the given information to answer Q.31, Q.32 and Q.33.

The given diagram shows a circle with centre  $O$ . Two tangents are drawn each from points  $P$  and  $Q$  to the circle at points  $S$  and  $R$  respectively that form a quadrilateral  $PSQR$ .



NOT TO SCALE

31. If  $\angle SQR = 72^\circ$ , then the value of  $x$  is equal to

- A.  $18^\circ$
- B.  $36^\circ$
- C.  $54^\circ$
- D.  $81^\circ$

32. The angle  $SOP$ , in terms of  $y$ , will be

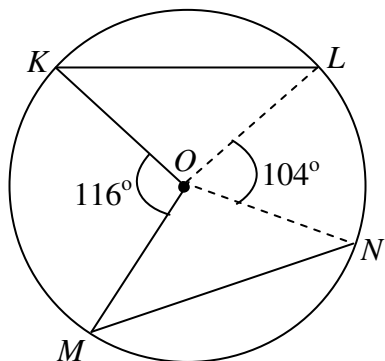
- A.  $90^\circ - y^\circ$
- B.  $90^\circ - \frac{y^\circ}{2}$
- C.  $90^\circ - 2y^\circ$
- D.  $\frac{1}{2}(90^\circ - y^\circ)$

33. The total length of the sides of quadrilateral  $PSQR$

- A. is  $2m + 2n$
- B. is  $2m + n$
- C. is  $2mn$
- D. cannot be determined.

Use the given information to answer Q.34 and Q.35.

In the given circle, two arcs  $KL$  and  $MN$  are congruent.



NOT TO SCALE

34. Given that the half of chord  $MN$  is  $m$ , the length of chord  $KL$  will then be

- A.  $m$
- B.  $\frac{m}{2}$
- C.  $2m$
- D.  $\frac{1}{2} + m$

35. The angle  $MON$  will be

- A.  $220^\circ$
- B.  $140^\circ$
- C.  $110^\circ$
- D.  $70^\circ$

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