BOARD OF INTERMEDIATE EDUCATION (AP)

HALF YEARLY EXAMINATIONS - 2021

JUNIOR INTER MATHEMATICS - IB

MODEL PAPER - 2 (English Version)

Time: 3 Hours **Max.Marks: 75**

SECTION – A

Note: i) Very short answer type questions. **$10 \times 2 = 20$**

ii) Answer All questions.

iii) Each question carries Two marks.

1. Find the equation of the straight line passing through (–2, 4) and making non – zero intercepts whose sum is zero.

2. Show that the points (1, 3), (–2, –6), (2, 6) are collinear.

3. Find ‘x’ if the distance between (5, –1, 7) and (x, 5, 1) is 9 units.

4. Show that the points (1, 2, 3), (2, 3, 1) and (3, 1, 2) form an equilateral triangle.

5. Find the fourth vertex of the parallelogram whose consecutive vertices are (2, 4, –1), (3, 6, –1) and (4, 5, 1).

6. Reduce the equation $x + 2y - 3z - 6 = 0$ of the plane to the normal form.

7. Write the equation of the plane $4x - 4y + 2z + 5 = 0$ into intercept form.

8. Find the equation of the plane passing through the point (1, 1, 1) and parallel to the plane

$x + 2y + 3z - 7 = 0$.

9. Compute $\lim_{x \to 0} x^2 \cos \frac{2}{x}$.

10. Compute $\lim_{x \to 0} \frac{e^x - 1}{\sqrt{1 + x} - 1}$.

SECTION – B

Note: i) Short answer type questions. **$5 \times 4 = 20$**

ii) Answer any Five questions.

iii) Each question carries 4 marks.

11. Find the equation of locus at P, if the line segment joining (2, 3) and (–1, 5) subtends a right angle at P.

12. If the distance from P to the points (2, 3) and (2, –3) are in the ratio 2 : 3, then find the equation of locus of P.

13. A(2, 3) and B(–3, 4) are two given points. Find the equation of locus of P so that the area of the triangle PAB is 8.5.

14. Transform the equation $\sqrt{3}x + y = 4$ into

i) slope − intercept form ii) intercept form iii) normal form.

15. If the straight lines ax + by + c = 0, bx + cy + a = 0 and cx + ay + b = 0 are concurrent, then prove that $a^3 + b^3 + c^3 = 3abc$.

16. Check the continuity of the function f given below at 1 and 2

$$f(x) = \begin{cases} x + 1 & \text{if } x \leq 1 \\ 2x & \text{if } 1 < x < 2 \\ 1 + x^2 & \text{if } x \geq 2 \end{cases}$$

17. If f is given by $f(x) = \begin{cases} k^2 x - k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$ is a continuous function on R, then find the values of k.

SECTION − C

Note: i) Long answer type questions. **$5 \times 7 = 35$**

ii) Answer any Five questions.

iii) Each question carries 7 marks.

18. Find the circumcentre of the triangle whose vertices are (−2, 3), (2, −1) and (4, 0).

19. Find the orthocenter of the triangle whose vertices are (−2, −1), (6, −1) and (2, 5).

20. If Q(h, k) in the foot of the perpendicular from $P(x_1, y_1)$ on the straight lines ax + by + c = 0, then show that $(h - x_1) : a = (k - y_1) : b = -(ax_1 + by_1 + c) : (a^2 + b^2)$.

21. Prove that the equation $3x^2 + 7xy + 2y^2 + 5x + 5y + 2 = 0$ represents a pair of straight lines and find the coordinates of the point of intersection.

22. Find the angle between the lines joining the origin to the points of intersection of the curve

$x^2 + 2xy + y^2 + 2x + 2y - 5 = 0$ and the line $3x - y + 1 = 0$.

23. Find the condition for the lines joining the origin to the points of intersection of the circle

$x^2 + y^2 = a^2$ and the line $lx + my = 1$ to coincide.

24. Find the direction cosines of two lines which are connected by the relations $l + m + n = 0$ and $mn - 2nl - 2lm = 0$

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