Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

Max. Marks : 120 **Max. Time : 1 Hr.**

Important Instructions :

1. The test is of **1 hour** duration and max. marks 120.
2. The test consists **30** questions, **4 marks** each.
3. Only one choice is correct **1 mark** will be deducted for incorrect response. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
4. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 3 above.

1. The area of the triangle formed by the lines x = 0, y = 0 and $\frac{x}{a}+\frac{y}{b}$ = 1 is

(1) $\frac{1}{2}$|ab| (2) |ab| (3) 2|ab| (4) $\frac{1}{3}$|ab|

2. The area enclosed with the curve 2|x| + 3|y| = 1 is

(1) $\frac{1}{4}$ (2) $\frac{1}{3}$ (3) $\frac{1}{12}$ (4) $\frac{1}{15}$

3. If y-intercept of the line 4x – ay = 8 is thrice its x-intercept then the value of a is equal to

(1) $\frac{3}{4}$ (2) $\frac{4}{3}$ (3) $-\frac{3}{4}$ (4) $-\frac{4}{3}$

4. The distance between the point (1,2) and the point of intersection of the lines 2x + y = 2 and x + 2y = 2 is

(1) $\frac{\sqrt{17}}{3}$ (2) $\frac{\sqrt{16}}{3}$ (3) $\frac{\sqrt{17}}{5}$ (4) $\frac{\sqrt{19}}{3}$

5. If the slope of the line joining the point (3,4) and (–2,a) is equal to $\frac{-2}{5}$, then the value of a is equal to.

(1) 6 (2) 4 (3) 3 (4) 2

6. If the co-ordinates of the vertices A, B, C of the triangle ABC be (–4,2), (12, –2) and (8, 6) respectively, then ∠B =

(1) $\tan^{-1}(-\frac{6}{7})$ (2) $\tan^{-1}(\frac{6}{7})$ (3) $\tan^{-1}(-\frac{7}{6})$ (4) $\tan^{-1}(\frac{7}{6})$

7. The points lying on the line x + y = 4 which are at a unit distance from the line 4x + 3y = 10, are

(1) (3, 1),(–7,11) (2) (3, 1),(7,11) (3) (–3, 1),(–7,11) (4) (1, 3),(–7,11)

8. The orthocentre of the triangle formed by lines $4x - 7y + 10 = 0$, $x + y = 5$ and $7x + 4y = 15$ is
(1) (1,2) (2) (1,–2) (3) (–1, –2) (4) (–1,2)

9. If equation of three sides of a triangle are $x = 2$, $y + 1 = 0$ and $x + 2y = 4$, then co-ordinates of circumcentre of this triangle is
(1) (4,0) (2) (2,–1) (3) (0, 4) (4) (–1,2)

10. The equation to the straight line passing through the point $(a\cos^3\theta, a\sin^3\theta)$ and perpendicular to the line $x\sec\theta + y\,\text{cosec}\,\theta = a$, is
(1) $x\cos\theta - y\sin\theta = a\cos 2\theta$ (2) $x\cos\theta + y\sin\theta = a\cos 2\theta$
(3) $x\sin\theta + y\cos\theta = a\cos 2\theta$ (4) $x\sin\theta - y\cos\theta = a\cos 2\theta$

11. The distance between $4x + 3y = 11$ and $8x + 6y = 15$, is
(1) $\frac{7}{2}$ (2) 4 (3) $\frac{7}{10}$ (4) $\frac{10}{3}$

12. Number of points having distance $\sqrt{5}$ from the straight line $x - 2y + 1 = 0$ and a distance $\sqrt{13}$ from the line $2x + 3y - 1 = 0$ is
(1) 1 (2) 2 (3) 4 (4) 5

13. Which of the following line is concurrent with the lines $3x + 4y + 6 = 0$ and $6x + 5y + 9 = 0$
(1) $2x + 3y + 5 = 0$ (2) $3x + 3y + 5 = 0$
(3) $7x + 9y + 3 = 0$ (4) $9x + 7y + 11 = 0$

14. The least positive value of 't' so that the lines $x = t + \alpha$, $y + 16 = 0$ and $y = \alpha x$ are concurrent is
(1) 2 (2) 4 (3) 16 (4) 8

15. The triangle formed by $x^2 - 9y^2 = 0$ and $x = 4$ is
(1) isosceles (2) equilateral (3) right angled (4) scalene

16. Given vertices A (1,1), B (4,–2) and C (5,5) of a triangle, then the equation of the perpendicular dropped from C to the interior bisector of the angle A is
(1) $y - 5 = 0$ (2) $x - 5 = 0$ (3) $y + 5 = 0$ (4) $x + 5 = 0$

17. The sides AB, BC, CD and DA of a quadrilateral are $x + 2y = 3$, $x = 1$, $x - 3y = 4$, $5x + y + 12 = 0$ respectively. The angle between diagonals AC and BD is
(1) 45° (2) 60° (3) 30° (4) 90°

18. A variable line passes through a fixed point P. The algebric sum of the perpendicular drawn from (2,0), (0,2) and (1,1) on the line is zero, then the co-ordinates of the P are
(1) (1,–1) (2) (1,1) (3) (2, 1) (4) (2,2)

19. The equation $x^3 - yx^2 + x - y = 0$ respresents
(1) A hyperbola and two straight lines (2) A straight line
(3) A parabola and two straight lines (4) A straight line and a circle

20. Two vertices of a triangle are (5, –1) and (–2,3). If orthocentre is the origin then co-ordinates of the third vertex are
(1) (7,4) (2) (–7,–4) (3) (4, 7) (4) (–4,–7)

21. Locus of points which are at equal distance from 3x + 4y – 11 = 0 and 12x + 5y + 2 = 0 and which is near to the origin is

(1) 21x – 77 y + 153 = 0 (2) 99x + 77y – 133 = 0

(3) 7x – 11y = 19 (4) none of these

22. Choose the correct statement which describes the position of the point (–6,2) relative to straight lines 2x + 3y – 4 = 0 and 6x + 9y + 8 = 0

(1) below both lines (2) above both lines (3) between both lines (4) none of these

23. If the equation of base of an equilateral triangle is 2x – y = 1 and the vertex is (–1,2) then the length of the side of the triangle is

(1) $\sqrt{\frac{20}{3}}$ (2) $\frac{2}{\sqrt{15}}$ (3) $\sqrt{\frac{8}{15}}$ (4) $\sqrt{\frac{15}{2}}$

24. The equation of acute angle bisector between the lines 3x + 4 y – 1 = 0 and 12x – 5y – 2 = 0 is

(1) 11x + 3y + 17 = 0 (2) 11x + 3y – 17 = 0

(3) 3x + 11y – 17 = 0 (4) 99x + 27y = 23

25. If the centroid and circum centre of a triangle are (3,3) and (6,2) respectively then the orthocentre is

(1) (–3,5) (2) (–3,1) (3) (3, –1) (4) (9,5)

26. The equations ax + by + c = 0 and dx + ey + f = 0 represents the same straight line if and only if

(1) $\frac{a}{d}=\frac{b}{e}$ (2) c = f (3) $\frac{a}{d}=\frac{b}{e}=\frac{c}{f}$ (4) a = d, b=e, c = f

27. The distance of the point (2,3) from the line 3x + 2y = 17, measured parallel to the line x – y = 4 is

(1) $4\sqrt{2}$ (2) $5\sqrt{2}$ (3) $\sqrt{2}$ (4) none of these

28. The point (1,β) lies on or inside the triangle formed by the lines y = x, x - axis and x + y = 8, if

(1) 0< β < 1 (2) 0 ≤ β ≤ 1 (3) 0< β < 8 (4) β∈R

29. The image of the point (4,–13) in the line 5x + y +6 =0 is

(1) (1,2) (2) (–4,13) (3) (–1,–14) (4) (3,4)

30. The new co-ordinates of a point (4,5) when the origin is shifted to the point (1,–2) are

(1) (5,3) (2) (3,5) (3) (3,7) (4) (–2,1)

Practice Test (JEE-Main Pattern)

OBJECTIVE RESPONSE SHEET (ORS)

Straight Line

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

PART - II : PRACTICE QUESTIONS

1. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G.P. with the same common ratio, then the points (x_1, y_1), (x_2, y_2) and (x_3, y_3)

(1) lie on a straight line (2) lie on the ellipse

(3) lie on a circle (4) are vertices of a triangle

2. Let PQR be a right angled isosceles triangle, right angled at P(2, 1). If the equation of the line QR is $2x + y = 3$, then the equation representing the pair of lines PQ and PR is

(1) $3x^2 - 3y^2 + 8xy + 20x + 10y + 25 = 0$ (2) $3x^2 - 3y^2 + 8xy - 20x - 10y + 25 = 0$

(3) $3x^2 - 3y^2 + 8xy + 10x + 15y + 20 = 0$ (4) $3x^2 - 3y^2 - 8xy - 10x - 15y - 20 = 0$

3. Four points (x_1, y_1), (x_2, y_2), (x_3, y_3) and (x_4, y_4) are such that $\sum_{i=1}^{4}(x_i^2 + y_i^2) \le 2(x_1x_3 + x_2x_4 + y_1y_2 + y_3y_4)$ Then these points are vertices of

(1) Parallelogram (2) Rectangle (3) Square (4) Rhombus

4. Let PS be the median of the triangle with vertices P(2, 2), Q(6, –1) and R(7, 3). The equation of the line passing through (1, –1) and parallel to PS is

(1) $2x - 9y - 7 = 0$ (2) $2x - 9y - 11 = 0$ (3) $2x + 9y - 11 = 0$ (4) $2x + 9y + 7 = 0$

5. The incentre of the triangle with vertices $(1, \sqrt{3})$, (0, 0) and (2, 0) is

(1) $\left(1, \frac{\sqrt{3}}{2}\right)$ (2) $\left(\frac{2}{3}, \frac{1}{\sqrt{3}}\right)$ (3) $\left(\frac{2}{3}, \frac{\sqrt{3}}{2}\right)$ (4) $\left(1, \frac{1}{\sqrt{3}}\right)$

6. Let a, b, c be real numbers with $a^2 + b^2 + c^2 = 1$. The equation

$$\begin{vmatrix} ax-by-c & bx+ay & cx+a \\ bx+ay & -ax+by-c & cy+b \\ cx+a & cy+b & -ax-by+c \end{vmatrix} = 0$$ represents a

(1) straight line (2) Circle (3) Parabola (4) Ellipse

7. The number of integer values of m, for which the x-coordinate of the point of intersection of the lines, $3x + 4y = 9$ and $y = mx + 1$ is also an integer is

(1) 2 (2) 0 (3) 4 (4) 1

8. The area bounded by the curves $y = |x| - 1$ and $y = -|x| + 1$ is

(1) 1 (2) 2 (3) $2\sqrt{2}$ (4) 4

9. Let $0 < \alpha < \frac{\pi}{2}$ be fixed angle. If P = (cosθ, sin θ) and Q = (cos(α – θ), sin (α – θ)), then Q is obtained from P by

(1) clockwise rotation around origin through an angle α

(2) anticlockwise rotation around origin through an angle α

(3) reflection in the line through origin with slope tan α

(4) reflection in the line through origin with slope tan (α/2)

10. A straight line through the origin O meets the parallel lines 4x + 2y = 9 and 2x + y + 6 = 0 at points P and Q respectively. Then the point O divides the segement PQ in the ratio

(1) 1 : 2 (2) 3 : 4 (3) 2 : 1 (4) 4 : 3

11. Consider three points

P = (– sin (β – α), – cos β), Q = (cos(β – α), sin β) and R = (cos (β – α + θ), sin (β – θ)), where 0 < α, β , θ < $\frac{\pi}{4}$. Then,

(1) P lies on the line segment RQ (2) Q lies on the line segment PR

(3) R lies on the line segment QP (4) P, Q, R are non-collinear

12. The locus of the orthocentre of the triangle formed by the lines

(1 + p) x – py + p (1 + p) = 0, (1 + q) x – qy + q(1 + q) = 0 and y = 0, where p ≠ q, is

(1) a hyperbola (2) a parabola (3) an ellipse (4) a straight line

13. Equations to the straight lines passing through

(i) The point (3, 2) and the point of intersection of the lines 2x + 3y = 1 and 3x – 4y = 6.

(ii) The intersection of the lines x + 2y + 3 = 0 and 3x + 4y + 7 = 0 and perpendicular to the straight line y – x = 8.

(1) 43x – 29y + 71 = 0 & x + y + 2 = 0 (2) 43x – 29y = 71 & x + y + 2 = 0

(3) 43x + 29y = 71 & x – y + 2 = 0 (4) 43x – 29y = 71 & x + y = 2

14. If $P\left(1+\frac{t}{\sqrt{2}}, 2+\frac{t}{\sqrt{2}}\right)$ be any point on a line, then the range of values of t for which the point P lies between the parallel lines x + 2y = 1 and 2x + 4y = 15 is

(1) $-\frac{4\sqrt{2}}{3} < t < \frac{5\sqrt{2}}{6}$ (2) $0 < t < \frac{5\sqrt{2}}{6}$ (3) $-\frac{4\sqrt{2}}{5} < t < 0$ (4) $-\frac{4\sqrt{2}}{3} < t < \frac{\sqrt{2}}{6}$

15. The point A(4, 1) undergoes following transformations successively :

(i) reflection about line y = x

(ii) translation through a distance of 3 units in the positive direction of x-axis

(iii) rotation through an angle 105° in anti-clockwise direction about origin O.

Then the final position of point A is

(1) $\left(\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$ (2) $\left(-2, 7\sqrt{2}\right)$ (3) $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$ (4) $\left(-2\sqrt{6}, 2\sqrt{2}\right)$

16. Point P(2, 3) lies on the line 4x + 3y = 17. Then find the co-ordinates of points farthest from the line which are at 5 units distance from the P.

(1) (6, 6) (2) (6, –6) (3) (2, 0) (4) (–2, 0)

17. Find the equation of the line passing through the point (2, 3) & making intercept of length 2 units between the lines y + 2x = 3 & y + 2x = 5.

(1) 3x – 4y = 18 (2) x = 2 (3) 3x + 4y = 18 (4) x + 2 = 0

18. Find the equation of straight line passing through the point (4, 5) and equally inclined to the lines 3x = 4y + 7 and 5y = 12x + 6 is

(1) 9 x − 7 y = 1 (2) 9 x + 7 y = 71 (3) 7 x + 9 y = 73 (4) 7 x − 9 y + 17 = 0

19. Let D(x_4, y_4) be a point such that ABCD is a square & M & P are the midpoints of the sides BC & CD respectively, then

(1) Ratio of the areas of ΔAMP and the square is 3 : 8

(2) Ratio of the areas of ΔMCP & ΔAMD is 1 : 1

(3) Ratio of the areas of ΔABM & ΔADP is 1 : 1

(4) Ratio of the areas of the quandrilateral AMCP and the square is 1 : 3

20. The sides of a triangle are the straight line x + y = 1, 7y = x and $\sqrt{3}$ y + x = 0. Then which of the following is an interior points of triangle ?

(1) circumcentre (2) centroid (3) incentre (4) orthocentre

21. Given a ΔABC with unequal sides. P is the set of all points which is equidistant from B & C and Q is the set of all point which is equidistant from sides AB and AC. Then n(P ∪ Q) equals :

(1) 1 (2) 2 (3) 3 (4) Infinite

22. A line segment AB is divided internally and externally in the same ratio (> 1) at P and Q respectively and M is mid point of AB.

Statement-1: MP, MB, MQ are in G.P.

Statement-2 AP, AB and AQ are in HP.

(1) STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1

(2) STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-1Pro

(3) STATEMENT-1 is true, STATEMENT-2 is false

(4) STATEMENT-1 is false, STATEMENT-2 is true

(5) Both STATEMENTS are false

Straight Line

APSP Answers

PART - I

1.	(1)	**2.**	(2)	**3.**	(4)	**4.**	(1)	**5.**	(1)	**6.**	(4)	**7.**	(1)
8.	(1)	**9.**	(1)	**10.**	(1)	**11.**	(3)	**12.**	(3)	**13.**	(2)	**14.**	(4)
15.	(1)	**16.**	(2)	**17.**	(4)	**18.**	(2)	**19.**	(2)	**20.**	(4)	**21.**	(2)
22.	(1)	**23.**	(1)	**24.**	(4)	**25.**	(1)	**26.**	(3)	**27.**	(3)	**28.**	(2)
29.	(3)	**30.**	(3)								

PART - II

1.	(1)	**2.**	(2)	**3.**	(2)	**4.**	(4)	**5.**	(4)	**6.**	(1)	**7.**	(1)
8.	(2)	**9.**	(4)	**10.**	(2)	**11.**	(4)	**12.**	(4)	**13.**	(2)	**14.**	(1)
15.	(4)	**16.**	(1, 4)	**17.**	(2, 3)	**18.**	(1, 3)	**19.**	(1, 3)	**20.**	(2, 3)	**21.**	(2)
22.	(1)										