THE O.P. GUPTA
ADVANCED MATH CLASSES

Mathematics (Standard & Basic)
Topic - Pair of Linear Equations in Two Variables

RTS-03

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RANKERS
TEST SERIES FOR X

Max. Marks - 40
Time - 90 Minutes

SECTION A

*Following multiple choice questions are of **1 Mark** each (Q01-10).*
Select the correct option in each one of them.

Q01. If a pair of linear equations is inconsistent, then the lines will be
(A) parallel (B) intersecting or coincident
(C) always coincident (D) always intersecting

Q02. The pair of equations $-x+2y+5=0$ and $-3x-6y+1=0$ has
(A) a unique solution (B) exactly two solutions
(C) infinitely many solutions (D) no solution

Q03. The pair of equations $y=0$ and $y=6$ has
(A) one solution (B) two solutions
(C) infinitely many solutions (D) no solution

Q04. The pair of equations $x=b$ and $y=a$ graphically represents lines which are
(A) parallel (B) intersecting at (b, a)
(C) coincident (D) intersecting at (a, b)

Q05. For what value of k, do the equations $3x-y+8=0$ and $6x-ky+16=0$ represents coincident lines?
(A) $\frac{1}{2}$ (B) 1 (C) 2 (D) –2

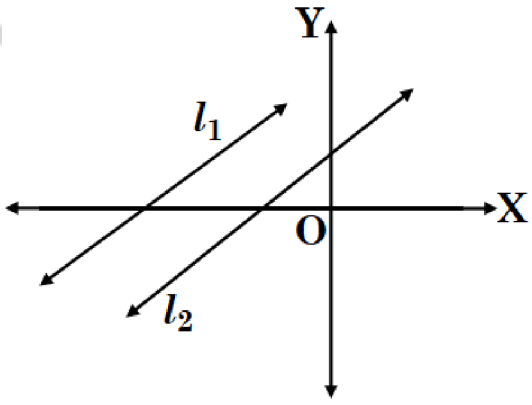
Q06. If the lines given by $4x+2ky=12$ and $2x+3y-6=0$ are overlapping, then the value of k is
(A) 5 (B) –3 (C) 4 (D) None of these

Q07. The value (s) of k, for which the pair of linear equations $kx+y=k^2$ and $x+ky=1$ has infinitely many solutions, is
(A) ±1 (B) 1 (C) –1 (D) 2

Q08. The greater of two supplementary angles exceeds the smaller by 18°. What is the measure of greater angle?
(A) 81° (B) 99° (C) 36° (D) 54°

*Followings are **Assertion-Reason based questions** (Q09 & 10).*
In the following questions, a statement of Assertion (**A**) is followed by a statement of Reason (**R**). Choose the correct answer out of the following choices.
(A) Both **A** and **R** are true and **R** is the correct explanation of **A**.
(B) Both **A** and **R** are true and **R** is not the correct explanation of **A**.
(C) **A** is true but **R** is false.
(D) **A** is false but **R** is true.

Q09. Consider the equations $l_1: y=2x+10$ and $l_2: 2y=4x+11$.
Assertion (A) : The given pair of linear equations is consistent.
Reason (R) : The lines l_1 and l_2 represented by the given equations are as shown below.



Q10. **Assertion (A) :** If $k = 2$, then system of equations given as $x + y = 4$ and $2x + ky = 3$ has no solution.
Reason (R) : The system of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is consistent with unique solution, if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$.

$[1 \times 10 = 10$

SECTION B

*Followings are of **2 Marks** each (Q11-12).*

Q11. (a) Solve for x and y : $mx - ny = m^2 + n^2$ and $x + y = 2m$.

OR

(b) Determine the value of k for which the given system of equations has infinitely many solutions :
$x + (k+1)y = 5$ and $(k+1)x + 9y = 8k - 1$.

Q12. The sum of two numbers is 58. The greater number exceeds twice the smaller number by 1. Find the numbers.

$[2 \times 2 = 4$

SECTION C

*Followings are of **3 Marks** each (Q13-16).*

Q13. The path of an express train A is given by the equation $x + 2y - 4 = 0$ and that of an express train B by the equation $2x + 4y - 12 = 0$. Represent this situation graphically. Also looking at the graph made by the given equations, what can be concluded about the solutions of given equations?

Q14. Solve the following pair of linear equations for x and y :
$101x + 102y = 304$ and $102x + 101y = 305$.

Q15. (a) A two-digit number is obtained by either multiplying the sum of the digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2. Find the number.

OR

(b) The students of a class are made to stand equally in rows. If 3 students are extra in each row, there would be 1 row less. If 3 students are less in a row, there would be 2 more rows. Find the number of students in the class.

Q16. Solve for x and y : $(a + 2b)x + (2a - b)y = 2$ and $(a - 2b)x + (2a + b)y = 3$.

$[3 \times 4 = 12$

SECTION D

*Followings are of **5 Marks** each (Q17-18).*

Q17. (a) Solve for p and q : $2^p + 3^q = 17$ and $2^{p+2} - 3^{q+1} = 5$.

OR

(b) A fruit vendor Madhukar Singh has apples and oranges in his shop. He tells a customer :
"Twice the price of an apple added to the price of an orange will be ₹22. The sum of the price of an apple and twice the price of an orange will be ₹20."
If the customer wants to buy 3 apples and 4 oranges, what amount should he pay?

Q18. Ishanvi scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Ishanvi would have scored 50 marks. Assuming that Ishanvi attempted all questions, find the total number of questions.

$[5 \times 2 = 10$

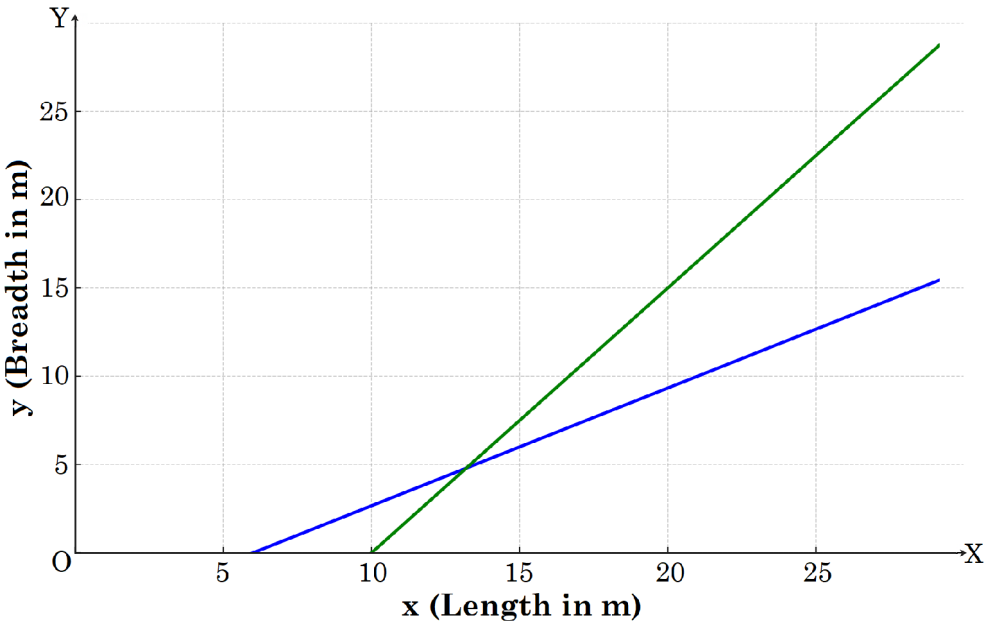
SECTION E

*Following is a case-study based question of **4 Marks** (Q19); having three sub-parts (i), (ii) and (iii).*

Q19. The management committee of a residential colony in Faridabad decided to construct a community center on a rectangular plot of land.
In a planning meeting, one of the members shared some estimates.

- He mentioned that if the length of the land (x) is increased by 3 meters and the breadth of the land (y) is decreased by 2 meters, the total area decreases by 18 square meters.
- On the other hand, if the length of the land (x) is reduced by 2 meters and the breadth of the land (y) is increased by 3 meters, the area increases by 24 square meters.

The following graph shows the linear equations representing the given conditions.



Based on the above information, answer the questions given below.

(i) Find the pair of equations, which correctly represents the above conditions?

(ii) What type of lines do the above equations obtained in **(i)** represent on the graph?

(iii) (a) The graphs of the two equations intersect at one point. Find this point, using substitution method.

OR

(b) What are the actual dimensions of the rectangular land selected for the community center?

[1 + 1 + 2 = 4

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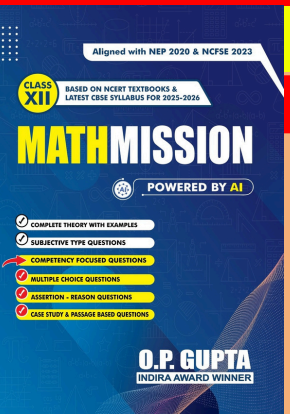

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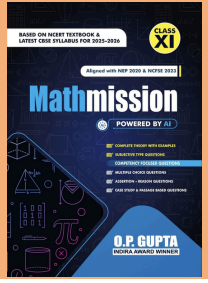

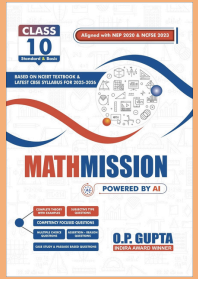

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