TIME: 3HRS
MARKS = 100

EXAM NO: 10 Straight lines & Linear Inequality

SECTION: A (TWO MARKERS): (Give complete explanation)

Ques 1 Solution of $\frac{5x-2}{3} - \frac{7x-3}{5} > \frac{x}{4}$ is

(A) $(-\infty, 4)$ (B) $(4, \infty)$ (C) $(-\infty, -4)$ (D) $(2, \infty)$

Ques 2 → Solution of $\frac{x+1}{x+2} \geq 1$ is

(A) $(-\infty, 2)$ (B) $(-\infty, -2)$ (C) $(-\infty, -2]$ (D) $(2, \infty)$

Ques 3 → Solution of $\frac{x+3}{x-2} \leq 2$ is

(A) $(-\infty, 2) \cup (7, \infty)$ (B) $(2, 7)$ (C) $(-\infty, 2) \cup [5, \infty)$ (D) none of these

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Ques 4 → Common solution of $\frac{5x}{4} + \frac{3x}{8} > \frac{39}{8}$ and

$\frac{2x-1}{12} - \frac{x-1}{3} < \frac{3x+1}{4}$ is

(A) $(-\infty, 3)$ (B) $(0, \infty)$ (C) $(0, 3)$ (D) $(3, \infty)$

Ques 5 → Solution of $1 \leq |x-2| \leq 3$ is

(A) $(-1, 1)$ (B) $[-1, 1] \cup [3, 5]$ (C) $[3, 5]$ (D) $[-1, 5]$

Ques 6 → A solution is to be kept b/w 86°F and 95°F.

The range of ~~temperate~~ temperature in degree celcius, if the conversion formula is given by

$$F = \frac{9}{5}C + 32$$ is

(A) between 25°C & 35°C (B) between 30°C & 35°C
(C) between 30°C & 40°C (D) none of these

Qn. 7 → Number of pairs of consecutive odd natural numbers, both of which are larger than 10 such that their sum is less than 40 are

(A) 1 (B) 2 (C) 3 (D) 4

Qn. 8 → Angle b/w two lines is $\frac{\pi}{4}$ and slope of one line is $1/2$, then the slope of the other line is

(A) only 3 (B) only $-1/3$ (C) -3 & $\frac{1}{3}$ (D) 3 & $-\frac{1}{3}$

Qn. 9 → If the points $(x,-1)$, $(2,1)$ & $(4,5)$ are collinear. Using the concept of equation of line, the value of x is

(A) 1 (B) 2 (C) -1 (D) 3

Qn. 10 → If the points $A(h,0)$ $B(a,b)$ & $C(0,k)$ lie on a line, then using concept of slopes which is correct?

(A) $\frac{a}{h}+\frac{b}{k}=1$ (B) $\frac{h}{a}+\frac{k}{b}=1$ (C) $ak+bh=1$ (D) none of these

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Qn. 11 → Equation of the right bisector of the line segment joining the points $A(2,3)$ & $B(6,-5)$ is

(A) $2x-y=6$ (B) $x+2y-6=0$ (C) $x-2y-6=0$ (D) $x-2y+6=0$

Qn. 12 → The ratio in is the line joining the points $(2,3)$ & $(4,-5)$ is divided by the

line joining the points (6,8) and (-3,-2) is

(A) 5:97 internally (B) 5:3 externally (C) 5:97 externally
(D) 97:5 externally

Q.No 13 → Equation of line passes through the point (4,-2) and whose intercept on y-axis is twice that on x-axis is

(A) $2x+y=6$ (B) $x+2y=6$ (C) $2x+y=12$ (D) none of these

Q.No 14 → the length of the perpendicular from the origin to a line is 7 and the line makes an angle of 150° with the +ve direction of Y-axis. Then the equation of line is

(A) $\sqrt{3}x+y=14$ (B) $x+\sqrt{3}y=14$ (C) $\sqrt{3}x-y=14$ (D) none of these

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Q.No 15 → values of 'k' for which the line $(k-3)x-(4-k^2)y+(k^2-7k+6)=0$ is parallel to Y-axis

(A) $k=\pm 3$ (B) $k=3$ (C) $k=\pm 2$ (D) $k=2$ only

Q.No 16 → values of θ and p, if the equation $x\cos\theta+y\sin\theta=p$ is the normal form of the line $\sqrt{3}x+y+2=0$ are

(A) $150°$ & 1 (B) $60°$ & 2 (C) $210°$ & 1 (D) none of these

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Qn. 17 → value of λ so that the three lines $2x-5y+3=0$, $5x-9y+\lambda=0$ and $x-2y+1=0$ are concurrent is

(A) $\lambda=-4$ (B) $\lambda=4$ (C) $\lambda=3$ (D) $\lambda=-5$

Qn. 18 → The foot of perpendicular drawn from the point $(1,-2)$ on the line ~~$2x+1$~~ $y=2x+1$ is

(A) $(1,1)$ (B) $(-1,-1)$ (C) $(0,1)$ (D) $(2,-1)$

Qn. 19 → angle b/w the lines $y=(2-\sqrt{3})x+5$ and $y=(2+\sqrt{3})x-7$ is

(A) $\pi/2$ (B) $\pi/6$ (C) $\pi/4$ (D) none of these

Qn. 20 → points on X-axis whose perpendicular distance from the line $4x+3y=12$ is 4 are

(A) $(7,0)$ & $(0,12)$ (B) $(0,8)$ & $(-2,0)$ (C) $(8,0)$ & $(-3,0)$

(D) $(8,0)$ and $(-2,0)$

Qn. 21 → Distance b/w the two lines $3x-4y+9=0$ and $12x-16y-30=0$ is

(A) $\frac{10}{33}$ (B) $\frac{33}{10}$ (C) $\frac{31}{10}$ (D) $\frac{33}{11}$

Qn. 22 → value of k, if the line $7x+5y-4=0$ is

Perpendicular to the line $2x+3y+y+k(6x-y+12)=0$ is

(A) $k=\frac{29}{37}$ (B) $k=-\frac{29}{37}$ (C) $k=-\frac{37}{29}$ (D) $k=\frac{-21}{37}$

SECTION: B (FOUR MARKER) (NO Jugaad Bagzi)

QN. 23 → Show that the equations of the lines passing through the Intersection of the lines $4x-3y-1=0$ and $2x-5y+3=0$ and equally inclined to the axes are $x+y-2=0$ and $x=y$

QNr 24 → Show that the equation of the line mid-way between the parallel lines $9x+6y-7=0$ and $3x+2y+6=0$ is $18x+12y+11=0$

QN 25 → Show that the product of perpendiculars on the line $\frac{x}{a}\cos\theta+\frac{y}{b}\sin\theta=1$ from the points $(\sqrt{a^2-b^2},0)$ and $(-\sqrt{a^2-b^2},0)$ is b^2

QNs 26 → If p and q be the perpendiculars from the origin upon the lines $x\sec\theta+y\operatorname{cosec}\theta=a$ and $x\cos\theta-y\sin\theta=a\cos(2\theta)$. prove that $4p^2+q^2=a^2$

QNr 27 → Show that the image of the point $(-8,12)$ with respect to the line mirror $4x+7y+13=0$

is $(-16, -2)$

QN. 28 → A line is such that its segment between the lines $5x - y + 4 = 0$ and $3x + 4y - 4 = 0$ is ~~bisected~~ bisected at the point $(1, 5)$. Show that the equation of the line is $107x - 3y - 92 = 0$

QN. 29 → Show that the distance of the point $(2, 3)$ from the line $2x - 3y + 9 = 0$ measured along the line ~~making~~ $x - y + 1 = 0$ is $4\sqrt{2}$

QN. 30 → Vertices of a triangle are $A(10, 4)$ $B(-4, 9)$ $C(-2, -1)$. Show that the ~~ortho~~ orthocentre is $(-1, 9/5)$

QN. 31 → Show that the equations of lines passing through the intersection of the lines $x - y + 1 = 0$ and $2x - 3y + 5 = 0$ and whose distance from the point $(3, 2)$ is $7/5$ are $3x - 4y + 6 = 0$ and $4x - 3y + 1 = 0$

QN. 32 → Given Inequalities

$3x + 4y \leq 18$; $x - 6y \leq 3$; $2x + 3y \geq 3$; $-7x + 4y \leq 14$

and $x \geq 0$, $y \geq 0$

Show that on graph, the solution set (common solution) is a polygon with 6 sides.

Q.N 33 → Show that the solution of

$|x-1| + |x-2| \geq 4$ is $(-\infty, -1/2] \cup [7/2, \infty)$

Q.N 34 → Show that the solution of

$$\frac{|x-2|-1}{|x-2|-2} \leq 0 \quad \text{is} \quad [0,1] \cup [3,4]$$

Q.N. 35 → A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5%, but less than 7% acid. If there is 460 litres of the 9% solution, then show that 3% solution should be more than 230 litres and less than 920 litres

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Q.N. 36 → Show that the solution set of the following inequalities

$x+2y \leq 3$, $3x+4y \geq 12$, $y \geq 1$,

$x \geq 0$, $y \geq 0$ is an empty set
