FUSCO'S SCHOOL (I.C.S.E)

Indiranagar, Bangalore
HALF YEARLY EXAMINATION 2016-17
Subject: Mathematics

Time: 2 $\frac{1}{2}$ hrs.

Class: IX Marks: 80

Section – A

Question 1

a) Find the equation of the line passing through (- 2, 1) and perpendicular to   3
   $4x + 5y = 6$.

b) Given A = $\begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}$, B = $\begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and C = $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$; find the matrix X   3

   such that : $A + X = 2B + C$ 4

c) A and B are two points on the x- axis and
   y-axis respectively. P (2, -3) is the midpoint of AB. Find the
   i.   The co-ordinates of A and B
   ii. Slop of line AB
   iii. Equation of line AB
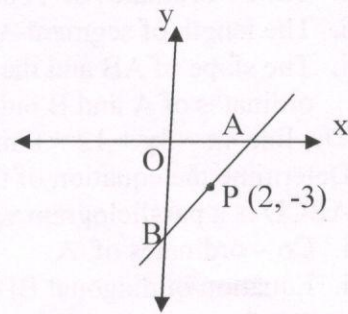
Question 2

a) If 69.5 is the mean of 72,70, x,62, 50, 71, 90, 64, 58, and 82 :   3
   Find the value of x

b) If 2 $\begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ + 3 $\begin{bmatrix} 1 & 3 \\ y & 2 \end{bmatrix}$ = $\begin{bmatrix} z & -7 \\ 15 & 8 \end{bmatrix}$, find the values of x, y and z.   3

c) A (1, 4), B (3, 2) and C(7, 5) are vertices of a triangle ABC. Find   4
   i.   The co- ordinates of the centroid of triangle ABC
   ii. The equation of a line , through the centroid and parallel to AB.

Question 3

a) If the lines $y = 3x + 7$ and $2y + px = 3$ are perpendicular to each other, find the   3
   value of p.

b) The ages of 40 students are given in the following table: 3

Age (years)	12	13	14	15	16	17	18
No of students	2	4	6	9	8	7	4

   Find the arithmetic mean.

c) Given A = $\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix}$, Find :   4

   i. $A – B$ ii A^2 iii AB iv $A^2 – AB + 2B$

Question 4

a) Find the value of k so that PQ will be parallel to RS . Given: 3
   P(2, 4), Q(3, 6), R(8, 1) and S(10, k)

b) Find the equation of the line, whose x- intercept = 3 and y -intercept = -6   3

c) The following table gives the heights of plants in centimetre. If the mean height   4
   of plants is 60. 95 cm; find the value of 'f '

Height (cm)	50	55	58	60	65	70	71
No. of plants	2	4	10	f	5	4	3

Section B

Question 5

a) Evaluate: $\begin{bmatrix} 4\sin30° & 2\cos60° \\ \sin90° & 2\cos0° \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$ 4

b) The following table gives the weekly wages of workers in a factory 6

Weekly wages(Rs.)	50 -55	55 -60	60-65	65-70	70-75	75-80	80-85	85-90
No. of workers	5	20	10	10	9	6	12	8

Calculate the mean by using Direct Method.

Question 6

a) The line $5x + 4y + 20 = 0$ meets the x-axis at point A and the y-axis at point B, Find : 3
   i. The co-ordinates of A and B.
   ii. The length of segment AB.
   iii. The slope of AB and the slope of perpendicular to AB ; by using the co-ordinates of A and B only.

b) The line $4x – 3y + 12 = 0$ meets x - axis at A. Write the co-ordinates of A. 3
   Determine the equation of the line through A and perpendicular $4x – 3y + 12 = 0$.

c) ABCD is a parallelogram where A(x, y), B(5, 8), C(4, 7) and D(2, -4) Find: 4
   i. Co – ordinates of A
   ii. Equation of diagonal BD.

Question 7

a) Given $A = \begin{bmatrix} 1 & 1 \\ -2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix}$ solve for matrix X : 4

   i. $X + 2A = B$
   ii. $3X + B + 2A = 0$
   iii. $3A – 2X = X – 2B$

b) Using Step- deviation method, calculate the mean marks of the following distribution; 6

Class interval	63-70	70-77	77-84	84-91	91-98	98-105	105-112
Frequency	9	13	27	38	32	16	15

Question 8

a) Given : $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$; find; 3
   i. A (BA)
   ii. (AB) B

b) Find the value of x , given that $A^2 = B$, 3
   $A = \begin{bmatrix} 2 & 12 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & x \\ 0 & 1 \end{bmatrix}$

c) The mean of the following distribution is 62.8 and the sum of all the frequencies is 50. Find the missing frequencies f_1 and f_2 . 4

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	f_1	10	f_2	7	8