Group B

Attempt any Six question

2. In a class of 100 students 40 students failed in Mathematics, 70 failed in English and 20 failed in both subject. Find
a. How many students passed in both subject ?
b. How many students passed in Mathematics only?
c. How many student failed in mathematics only?

3. Find the domain and range of the function f(x)=2x+13−x

4. Find the Maclurin series of the function f(x)=sinx

5. Prove that [1xx21yy21zz2]=(x - y)(y - z)(z - x)

6. Find a unit vector perpendicular to the plane containing points p(1,-1,0),Q(2,1,-1) and R(-1,1,2)

7. In how many ways can be letter of words "Sunday" be arraged? How many of these arrangement begin with S? How many begin with S and don't end with y?

8. If x + iy=1+i1−i then show that $x^2 + y^2=1$

Group C

Attempt any Two question

9.a) Define conic section. Find the coordinates of vertices, eccentricity and foci of the ellipse
$9x^2 + 4y^2 - 18x - 16y - 11=0$

b) If $T : R^2 \longrightarrow R^3$ defined by $T(x_1, x_2)=(x_1 + x_2, x_2,x_1)$ be the linear transformation. then find matrix associated with linear map T.

10. Define irrational number. Prove that $\sqrt{2}$ is an irrational number.

If function $f: R \longrightarrow R$ defined by $f(x)=2x + 1$ and g:R ⟶ R defined by $g(x)=x^2 - 2$. Find the formulae for composite function f * g and g * f and also verify that f * g ≠ g* g.

11. a) If arithmetic mean, geometic mean and harmonic mean between two unequal positive numbers are A,G,H respectively, then prove that A > G > H.

b. What is the relation between permutation and combination of *n* objects taken r at a time? A committee of 5 is to be constituted from 6 boys and 5 girls. In how many ways can this be done so as to include at least a boy and a girl?