Group B

Attempt any Six question

11. 32 students play basketball and 25 students play volleyball. It is found that 20 students play b0th the games. Find the number of students playing at least one game. Also, find total number of students if 13 students play none of these games

12. Let $f: \mathbb{N} \to \mathbb{N}$ by defined by $f(x)$ - $2x$ for all $x \in \mathbb{N}$ where $\mathbb{N}$ is the set of natural numbers. Show that f is one - one but not onto function.

13. If the three consecutive term of a geometric series be increased by their middle term, then prove that the resulting terms will be in harmonic progression. (H.S)

14. Find the adjoin of the matrix: $(1\ 2 - 2 - 1\ 3\ 0\ 0 - 2\ 1)$

15. Prove that $[1 + x\ 1\ 1\ 1\ 1 + y\ 1\ 1\ 1\ 1 + z]$

16. Find the equation of parabola with focus (-1,2) and directrix x=-5

17. Transform u= $[1 - 1]$ and v= $[- 2\ 3]$ by $[0 - 1\ 1\ 0]$ and check whether this transformation is linear.

Group C

Attempt any two questions:

18. Define permutation and combination. Try to establish relationship between them with the help of formula. In how many way can the letter of the word "LOGIC" be arranged so that:
i) Vowel may occupy odd position?
ii) No Vowels are together?

19. Define scalar and vector product in three dimensional space with their geometrical interpretation and prove the formula
$\sin(A + B)=\sin A\cos B + \cos A\sin B$ by using vector method.

20. Define the logarithmic function, state its properties and if
$f(x)=\log 1 + x\ 1 - x$ (-1 < x < 1), show that
$f(a) + f(b)=f(a + b\ 1 + a\ b)$ ($|a| < 2$, $|b|< 1$)