

**F. Y. B. Sc. (Computer Science) Internal Examination**  
**Algebra and Calculus (PAPER – II)**

[Time : 1 Hours]

[Max. Marks : 20]

**Q.1) Attempt following: (Any one) [5]**

- (1) State and prove Cauchy's Mean Value Theorem.
- (2) State and prove Langrange's Mean Value Theorem.

**Q.2) Answer the following: (Any Five) [5x3=15]**

(1) Prepare Composition table for Addition and Multiplication  
For  $Z_5$ .

(2) Find the remainder when  $7^{200} + 11^{800}$  is divided by 101.

(3) Evaluate:  $\lim_{x \rightarrow 0} \frac{a^x - b^x}{x}$

(4) For the functions  $f(x) = x^2 + 2$  and  $g(x) = x^3 - 1$ . Test wheather  
Cauchy's Mean value theorem hols in the interval (1,2) and  
If So ,find c.

(5) Verify Langrange.s Mean Value Thereom for  $f(x) = 3x^2 - 5x$   
where  $x \in [2,5]$

(6) Discuss the Continuity of the function:

$$F(x) = \frac{x^2 - 9}{x + 3} \quad x \neq -3$$
$$= \frac{3}{2} \quad x = -3$$