16. Using Lagrange's interpolation formula obtain the polynomial from the following data :

x	:	0	1	3	4
y	:	–12	2	6	12

Hence determine y when $x = 2$ and $x = 5$.

(12 marks)

Module IV

17. From the following data find dy/dx and d^2y/dx^2 at $x = 1.5$.

x	:	1.0	1.1	1.2	1.3	1.4
y	:	43.1	47.7	52.1	56.4	60.8

(12 marks)

Or

18. Determine the value of $\int_0^1 e^{-x^2}\,dx$ correct to four places of decimals using Simpson's rule with $h = 0.1$.

(12 marks)

Module V

19. Using the inversion integral method find the inverse z transform of :

$$\frac{z(2z-1)}{2(z-1)\left(z+\frac{1}{2}\right)}.$$

(12 marks)

Or

20. Using z-transform solve $u_{n+2} - 2u_{n+1} + u_n = 3_{n+5}$. (12 marks)

[5 × 12 = 60 marks]