Printed Pages – 3

I-1055

M.A./M.Sc. (Final) Examination, 2020

MATHEMATICS

(Optional)

Paper - V

(Difference Equation)

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 33

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. Solve :

$$y_{k+2} - 4y_{k+1} + 4y_k = 3k + 2^k$$

Q. 2. Find the solution of the difference equation :

$$4_{x+2} - 74_{x+1} + 124_x = \cos x$$

Q. 3. Write down the relation between Δ and Σ.

Q. 4. Solve the difference equation :

$$a_{r+2} - 3a_{r+1} + 2a_r = 0$$

with the initial condition

$$a_0 = 2,\ a_1 = 3$$

Q. 5. Explain the following :

(i) Disconjugacy

(ii) Riccati equations

Q. 6. Explain the boundary value problems for differential equations.

Q. 7. Solve the difference equation :

$$y'_{k+1}(t) = y_k(t),\ y_o(t) = t,\ y_k(0) = k$$

using the method of generating function.

Q. 8. Solve $y(k + 1) - ay(k) = \cos nk$.

Q. 9. Solve the equation :

$$y_{k+2} - 4y_k = 9k^2$$

Q. 10. Solve :

$$y_{k+1} - y_k + ky_{k+1}\, y_k = 0$$

given $y_1 = 2$