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K-1055

M.A./M.Sc. (Final) Examination, 2022

MATHEMATICS

(Difference Equations)

[Paper : Fifth]

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Passing Marks : 33

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

1. Explain the following :

   (a) Generating functions

   (b) Approximate summation

2. Find the solution of difference equation :

$$4_{x+2} - 72_{x+1} + 124_x = \cos x$$

3. Find the solution of the equation :

$u_n = 3u_{n-1} + 4$, given $u_o = 2$

4. Explain the following :

   (a) Disconjugancy

   (b) Riccati equations

5. For $\lambda \in R$, solve Sturm-Liouville problem :

$$y'' + \lambda y = 0,\ y(0) = y'(\pi) = 0$$

6. Explain the boundary value problems for differential equations.

7. Solve the difference equation :

$$y'_{k+1}(t) = y_k(t),\ y_0(t) = t,\ y_k(0) = k$$

using the method of generating function.

8. Find the inverse *z*-transform of :

$$\frac{3z}{(z+1)(z^2-1)}$$

9. Solve the equation :

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

10. Solve :

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

----x----