Exam date and time: 1/12/2020, 2:30 p.m.
Email to submit answer script: sgmmathsdept@gmail.com

SIR GURUDAS MAHAVIDYALAYA

Internal Examination - 2020

Second Year (1+1+1) MTMA, Paper - 3

Time - 2Hr., Full Marks -50

Attempt any five questions.

1. Prove that a non-trivial ring having no divisor of zero is a ring with unity.

2. Prove that every cyclic group is commutative. Is the converse true? Give an example.

3. Define convex set.
   Prove that the optimal hyperplane is the supporting hyperplane of the convex set of feasible solutions of an LPP.

4. Evaluate:
$$\lim_{x\to 0}\left(\frac{1}{x^2}-\frac{\cot x}{x}\right), \text{and} \lim_{x\to 0} x^{\frac{1}{x}}$$

5. Solve:
$$\frac{d^2y}{dx^2}-7\frac{dy}{dx}+6y=(x-2)e^x$$

6. Show that the following equation is integrable.
$$ydx+(x^2y-zx)dy+(x^2z-xy)dz=0$$

7. Find all basic solutions of the following system of equations:
$$4x_1+2x_2+3x_3+8x_4=6$$
$$3x_1+5x_2+4x_3-6x_4=8$$