

ELIXIIT ACADEMY
– The Toppers' Point



B.Sc Mathematics Sem-1 → ODE

MOCK TEST 2019

- **Answer all the questions.**
- **This question paper contains 14 Questions.**
- **Do not write anything on the question paper.**
- **Open this question paper only when you are told to do so.**
- **You are not suppose to use any calculators or mobile phones, if found, your paper will be immediately cancelled.**
- **Marking Scheme → the marks are written down beside each question. However, there are no negative markings**
- **You can answer in any order.**
- **The question numbers have to be written down correctly.**

TOTAL MARKS- 40 | Time limit- 1hr

1. Solve: $(D^5 - D)y = 12e^x + 8\sin x - 2x$ (5)

2. Solve: $x dx + y dy + \frac{x dy - y dx}{x^2 + y^2} = 0$ (2)

3. Solve: $\frac{dy}{dx} - \frac{\tan y}{1+x} = (1+x)e^x \sec y$ (3)

4. Solve: $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - 4y = 0$ (5)

5. Solve: $y = x + a \tan^{-1} p$ (1)

6. Find the orthogonal trajectories of co-axial circles $x^2 + y^2 + gx + c = 0$, where g is a parameter & c is constant. (3)

7. Solve: $p^3 + 2xp^2 - y^2p^2 - 2xy^2p = 0$ (1)

8. Solve: $(x^3 + 3xy^2)dx + (y^3 + 3x^2y)dy = 0$ (2)

9. Solve: $p = \log(px - y)$ (2)

10. Find the orthogonal trajectories of the family of hypocycloids $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$, where a is a variable parameter. (3)

11. Solve: $\frac{dx}{dt} + 5x + y = e^t$; $\frac{dy}{dt} - x + 3y = e^{2t}$ (5)

12. $\frac{dy}{dx} + \frac{ax+hy+g}{hx+by+f} = 0$ (2)

13. Solve using Clairaut's form: $y = 2px + y^2p^3$ (4)

14. Solve using method of variation of parameters (any one)

(a) $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ OR (b) $\frac{d^2y}{dx^2} + n^2y = \sec nx$

(2)