One Two academy

Maximum Marks: 45		num Marks: 45 Differential Equations 1	Duration: 90 minutes
Std 12 Business Mathematics and Statistics			
Ans	swe	er the following questions:	5 x 1 = 5
	1.	Define order and degree of Differential Equation.	
	2.	The integrating factor of the differential equation $\frac{dx}{dy} + Px =$	Q is
	3.	If $\sec^2 x$ is an integrating factor of the differential equation $\frac{2}{3}$	$\frac{dy}{dx} + Px = Q$ then P =
	4.	The general solution of the differential equation $\frac{dy}{dx} = \cos x$	is
	5.	Order and degree (if defined) of a differential equation are al	ways integers.
Answer any four of the following $4 \times 2 = 8$			
	6. 7.	Find the order and degree of the following differential equations $(x + y'')^2$ Find the differential equation of the family of curves $y = \frac{a}{x} + \frac{a}{x}$ arbitrary constants.	on $y' + (y'')^2 =$ b where a and b are
	8. a	Solve: $ydx - xdy = 0$	-mx + c when c is the
	5.	arbitrary constant	
	10.	Show that the differential equation for the function $y = e^{-1}$ and n are arbitrary constants is $e^{-1}\left(\frac{d^2y}{dx^2}\right) - 1 = 0$	+x + mx + n, where m
	11.	. Form the differential equation of the family of the parabelies an arbitrary constant	olas $y^2 = 4ax$, where a
Answer the following: 4 x 3 =			
	12.	Solve ydx – xdy - $3x^2y^2e^{x^3}dx = 0$	

- The sum of Rs.2,000 is compounded continuously, the nominal rate of interest being 5% per annum. In how many years will the amount be double the original principal?
- 14. Find the differential equation of the family of parabola with foci at the origin and axis along the x-axis
- 15. Solve the following differential equations $\frac{d^2\gamma}{dx^2} \frac{6 dy}{dx} + 8y = 0$
- 16. Find the differential equation of the family of all straight lines passing through the origin.

17. Solve:
$$\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$$
.

Answer any four of the following:

4 x 5 = 20

18. Form the differential equation by eliminating α and β from $(x - \alpha)^2 + (y - \beta)^2 = r^2$

- 19. The slope of the tangent to a curve at any point (x, y) on it is given by $(y^3 - 2yx^2) dx + (2xy^2 - x^3) dy = 0$ and the curve passes through (1, 2). Find the equation of the curve.
- 20. The normal lines to a given curve at each point (x,y) on the curve pass through the point (1,0). The curve passes through the point (1,2). Formulate the differential equation representing the problem and hence find the equation of the curve.
- 21. Solve. $\frac{dy}{dx} + y \cos x = \sin x \cos x$ 22. Solve: $(D^2 2D + 1)y = e^{2x} + e^x$
- 23. Solve: $(1+2e^{x/y}) dx + 2e^{x/y} \left(1 \frac{x}{y}\right) dy = 0$

ALL THE BEST