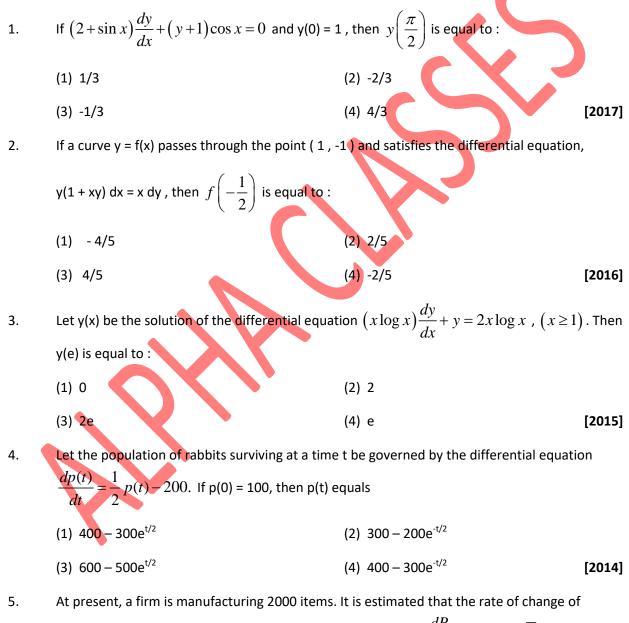
Differential Equations

JEE-MAINS (PREVIOUS YEAR)

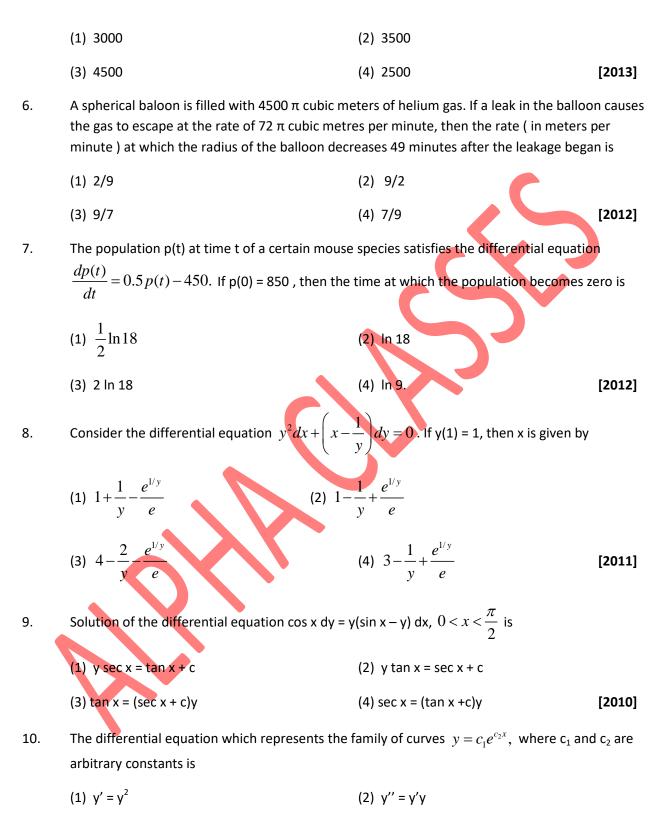
MCQ-Single Correct



production P w.r.t. additional number of workers x is given by $\frac{dP}{dx} = 100 - 12\sqrt{x}$. If the firm employs 25 more workers, then the new level of production of items is



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- The solution of the differential equation $\frac{dy}{dx} = \frac{x+y}{x}$ satisfying the condition y(1) = 1 is 11.
 - (2) $y = x \ln x + x^2$ (1) $y = \ln x + x$ (3) $y = xe^{(x-1)}$ (4) $y = x \ln x + x$

[2008]

[2007]

[2006]

- The differential equation of the family of circles with fixed radius 5 units and centre on the line y 12. = 2 is
 - (2) $(y-2)y'^2 = 25 (y-2)$ (1) $(x-2)y'^2 = 25 - (y-2)^2$ (4) $(x-2)^2 y'^2 = 25 - (y-2)^2$ (3) $(y-2)^2 y'^2 = 25 - (y-2)^2$ [2008]
- The normal to a curve at P(x,y) meets the x-axis at G. If the distance of G from the origin is twice 13. the abscissa of P, then the curve is
 - (1) an ellipse (2) a parabola (3) a circle (4) a hyperbola [2007]
- 14. The differential equation of all circles passing through the origin and having their centres on the x-axis is

(1)
$$x^{2} = y^{2} + xy \frac{dy}{dx}$$

(2) $x^{2} = y^{2} + 3xy \frac{dy}{dx}$
(3) $y^{2} = x^{2} + 2xy \frac{dy}{dx}$
(4) $y^{2} = x^{2} - 2xy \frac{dy}{dx}$

- The differential equation whose solution is $Ax^2 + By^2 = 1$, where A and B are arbitrary constants 15. is of
 - (1) second order and second degree (2) first order and second degree
- The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c > 0, is a 16. parameter, is of order and degree as follows:
 - (1) order 1, degree 2 (2) order 1, degree 1 (3) order 1, degree 3 (4) order 2, degree 2 [2005]

17. If
$$x \frac{dy}{dx} = y(\log y - \log x + 1)$$
, then the solution of the equation is

(3) first order and first degree



(4) second order and first degree

(1)
$$y \log \left(\frac{x}{y}\right) = cx$$

(2) $x \log \left(\frac{y}{x}\right) = cy$
(3) $\log \left(\frac{y}{x}\right) = cx$
(4) $\log \left(\frac{x}{y}\right) = cy$
(2005]
18. The differential equation for the family of curves $x^2 + y^2 - 2ay = 0$, where a is an arbitrary constant is
(1) $2(x^2 - y^2)y' = xy$
(2) $2(x^2 + y^2)y' = xy$
(3) $(x^2 - y^2)y' = 2xy$
(4) $(x^2 + y^2)y' = 2xy$
(5) $(x^2 - y^2)y' = 2xy$
(6) $(x^2 - y^2)y' = 2xy$
(7) $(x^2 - y^2)y' = 2xy'$
(7) $(x^2 - y^2)y' = 2x'$
(7) $(x^2 - y^2)y' = 2x'$
(8) $(x^2 - y^2)y' = 2x'$
(9) $(x^2 - y')y' = 2x'$
(1) $(x^2 - y^2)y' = 2x' + dy'$
(2) $(x^2 - y')y' = 2x'$
(3) $(x^2 - y')y' = 2x'$
(4) $(x^2 - y')y' = 2x'$
(5) $(x^2 - y')y' = 2x'$
(7) $(x^2 - y')y' = 2x'$
(8) $(x^2 - y')y' = 2x'$
(9



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- 23. The order and degree of the differential equation $\left(1+3\frac{dy}{dx}\right)^{2/3} = 4\frac{d^3y}{dx^3}$ are
 - (1) 1, 2/3 (2) 3,1
 - (3) 3,3 (4) 1,2

[2002]



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