

S.S.R. DEGREE COLLEGE, (AUTONOMOUS)

NIZAMABAD (C.C:5029)

I SEMESTER INTERNAL ASSESSMENT-I EXAMINATIONS

MATHEMATICS QUESTION BANK

I. Multiple Choice Questions

1. The condition for exactness for exact differential equation is _____. ()
a) $\frac{\partial m}{\partial y} = \frac{\partial N}{\partial x}$ b) $\frac{\partial y}{\partial m} = \frac{\partial x}{N}$ c) $\frac{\partial m}{\partial x} = \frac{\partial N}{\partial y}$ d) $\frac{\partial x}{\partial m} = \frac{\partial y}{N}$
2. If $Mx - Ny \neq 0$ in $Mdx + Ndy = 0$ then the required integrating factor is _____. ()
a) $Mx+Ny$ b) $\frac{1}{Mx+Ny}$ c) $Mx - Ny$ d) $\frac{1}{Mx-Ny}$
3. _____ differential are mostly used in physics and Engineering. ()
a) Exact b) Linear c) Clairuts d) None
4. Degree of $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^3 = r^2 \left(\frac{d^2y}{dx^2}\right)^2$ is _____. ()
a) 1 b) 2 c) 3 d) 4
5. The degree of $y = x \left(\frac{dy}{dx}\right) \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ is _____. ()
a) 2 b) 3 c) 4 d) 1
6. The order of $x^3 \frac{d^3y}{dx^3} + 2x^2 \frac{d^2y}{dx^2} - 3y = x$ is _____. ()
a) 2 b) 3 c) 1 d) 4
7. If $Mdx+Ndy=0$ is a homogenous equation such that $Mx+Ny \neq 0$ then the integrating factor of the differential equation is _____. ()
a) $Mx+Ny$ b) $Mx-Ny$ c) $\frac{1}{Mx+Ny}$ d) $\frac{1}{Mx-Ny}$
8. If $Mdx+Ndy=0$ such that $\frac{1}{M} \left(\frac{\partial N}{\partial x} - \frac{\partial m}{\partial y} \right) = f(y)$, then the integrating factor is ()
a) $e^{\int f(x)dx}$ b) e^x c) $e^{\int f(y)dy}$ d) e^y
9. The number of arbitrary constants in the solution of a differential equation of degree '2' and order '3' is _____. ()
a) 3 b) 1 c) 5 d) 2
10. Simultaneous differential equations can be solved using ()
a) Multipliers Method b) Grouping Method
c) a&b d) a (nor) b
11. The differential equation $P^2 + 2py (c + x = y^2)$ is solvable for ()
a) x b) y c) p d) None of the above

12. In the differential equation $f(x,y,p) = 0$ is solvable for 'x' then ()
 a) $y=f(x,p)$ b) $x=f(y,p)$ c) $p=f(x,y)$ d) $f= p(x,y)$
13. The General solution of $p^2 - 5p - 6 = 0$ where $p=\frac{dy}{dx}$ is_____ ()
 a) $(y-2x-c)(y+3x-c)=0$ b) $(y+2x-c)(y-3x-c)=0$
 c) $(y-2x-c)(y-3x-c) = 0$ b) $(y+2x+c)(y+3x+c) = 0$
14. The general solution of $(y-px)(p-1)=p$, $p=\frac{dy}{dx}$ is ()
 a) $y=cx$ b) $y=cx+\frac{c}{c+1}$ c) $y=cx+\frac{1}{c-1}$ d) $y=cx+\frac{c}{c-1}$
15. The degree of the differential equation on $y= \sin \frac{dy}{dx}$ is ()
 a) 1 b) 2 c) undefined d) 0
16. The G.S of fourth order differential equation contains _____ arbitrary constants ()
 a) 4 b) 3 c) 2 d) 1
17. The equation $x^2 - 2y^2 \frac{dy}{dx} = 0$ is_____ ()
 a) Non homogeneous b) Exact
 c) Homogeneous d) None
18. The equation $\frac{dy}{dx} + \frac{ax+hy+g}{hx+by+f} = 0$ is_____ ()
 a) Homogeneous b) Variable & separable
 c) Exact d) None homogeneous.
19. The integrating factor of $x \frac{dy}{dx} + y = y^2 \log x$ is_____ ()
 a) x b) $\frac{1}{x}$ c) -x d) x^2
20. The orthogonal trajectories of $r= 2a \cos \theta$ os ()
 a) $r= 2c \sec \theta$ b) $r= 2c \sin \theta$ c) $r= 2c \cot \theta$ d) $r= 2c \operatorname{cosec} \theta$

II. Fill in the blanks

- The solution of differential equation of the form $f(x)dx + g(y)dy=0$ is $\int f(x)dx + \int g(y)dy = 0$.
- The equation $\frac{dy}{dx} = \frac{y^2-x^2}{2xy}$ is a **Homogeneous D.E.**
- The integrating factor of $\frac{dy}{dx} - \frac{y}{x} = \log x$ is $\frac{1}{x}$.
- An equation of the form $\frac{dy}{dx} + py = Qy^n$ is known as **Bernoulli equation**.
- Exact differential equation is also known as **Total D.E**
- A given differential equation can be converted in to a exact differential equation by multiplying with a **Integrating Factor**.
- Exact differential equation is in the form of **$Mdx + Ndy=0$** .

8. Integrating factor of $\underline{d\left(\frac{e^x}{y}\right) = ye^x dx - e^x dy/y^2}$.
9. $\frac{ydx - xdy}{y^2}$ is integrating factor of $d\left(\frac{x}{y}\right)$.
10. If an exact differential equation is homogeneous then integrating factor is $\frac{1}{Mx+Ny}$. if $Mx+Ny \neq 0$.
11. The differential equation of the form $y=xf_1(p)+f_2(p)$ is known as **Lagrange equation**.
12. If the differential equation $f(x,y,z)=0$ is solvable for y, then **$y=f(x,y)$** .
13. The clairuts equation of the form is **$y=px+f(p)$** .
14. The rate of disintegration proportional to the amount 'A' is $\frac{dA}{dt} = -KA$.
15. The orthogonal trajectories for the family of circle is **Family of straight lines**.
16. The differential equation of $\frac{dx}{dy} + px = Qx^n$. where P & Q are functions 'y' can be reduced to the linear form by the substitution. **$x^{1-n} = z$** .
17. The G.S of $\frac{dy}{dx} + py = Q$ where P & Q are function of 'x' is given by **$y(I_f) = \int Q(I_f)dx + c$** .
18. An Integrating factor of $Mdx + Ndy = 0$ where $M=yf_1(x,y)$, $N=yf_2(x,y)$, is $\frac{1}{Mx+Ny}$.
19. The General solution of the equation $p^2 - 7p + 12 = 0$. where $p = \frac{dy}{dx}$ is **$(y-4x-c)(y-3x-c)=0$** .
20. If $Mdx+Ndy=0$ is not exact and $\frac{1}{N}\left(\frac{\partial m}{\partial y} - \frac{\partial N}{\partial x}\right) = f(x)$ then the integration factor of $Mdx+ Ndy=0$ is **$e^{\int f(x)dx}$** .

III. Write the Descriptive Question.

1. Solve $\frac{xdy}{dx} + 2y = x^2 \log x$.
2. Solve $(1+e^x/y)dx + e^x/y (1-x/y) dy = 0$
3. Solve $(x^2 + y^2) dx - 2xy dy = 0$
4. Solve $y+px = p^2x^4$
5. Solve $y^2 \log y = xpy + p^2$