University of Mumbai

Examination 2020 under cluster ___ (Lead College Shortname)

Sample Question Paper

Curriculum Scheme: Rev2016

Examination: First Year Semester II

Course Code: FEC201 and Course Name: Applied mathematics II

Time: 1 hour Max. Marks: 50

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For the students:- All the Questions are compulsory and carry equal marks .

Q1.	The differential equation $x\sin x dy + \left(xy\cos x - y\sin x - 2\right)dx = 0$ is
Option A:	Linear
Option B:	Exact
Option C:	Bernoulli's equation
Option D:	Homogeneous
Q2.	Find value of y at x = 1.1 using Taylor's series method, $\frac{dy}{dx} = x + y$. Given $y = 0 \; at \; x = 1.$ with $h = 0.1$.
Option A:	0.2428
Option B:	0.1113
Option C:	0.1103
Option D:	0.2824
Q3.	Which of the following is the solution of the differential equation $\frac{dy}{dx} + 3y = 0$?
Option A:	$y=3e^{-x}$
Option B:	$y=2e^{-3x}$
Option C:	$y=-3/2\ x^2$
Option D:	$y=3\ x^2$
Q4.	Evaluation of $\int_0^6 \frac{dx}{1+3x}$ by using Simpson's $1/3^{th}$ rule IS
Option A:	0.5616
Option B:	1.06845
Option C:	1.0473
Option D:	1.1585
Q5.	$B(\frac{3}{2},\frac{5}{2}) =$
Option A:	$\frac{\pi}{16}$
Option B:	$\frac{5}{2}$
Option C:	$\frac{15\pi}{4}$
Option D:	$\frac{-5}{2}$
Q6.	The value of dxdy in polar form is
Option A:	$drd\theta$

Option B:	$r^2 dr d\theta$
Option C:	$r dr d\theta$
Option D:	$\frac{dr d\theta}{r}$
Q7.	Solution of D.E. $\frac{d^4y}{dx^4}+2\frac{d^2y}{dx^2}+y=0$ is
Option A:	$e^x\left[(c_1+c_2x)\cos x+(c_3+c_4x)\sin x\right]$
Option B:	$(c_1+c_2x)\cos x+(c_3+c_4x)\sin x$
Option C:	$e^x(c_1\cos x+c_2\sin x)$
Option D:	$c_1\cos x+c_2\sin x$
Q8.	The differential equation $xy\left(1+xy^2\right)\frac{dy}{dx}=1$ is
Option A:	Linear
Option B:	Exact
Option C:	Bernoulli's equation
Option D:	Homogeneous
Q9.	By Euler's method,
Option A:	$y_n=y_{n-1}-hf\left(x_{n-1},y_{n-1}\right)$
Option B:	$y_n=y_{n-1}+hf\left(x_{n+1},y_{n+1}\right)$
Option C:	$y_n=y_{n-1}+hf\left(x_{n-1},y_{n-1}\right)$
Option D:	$y_n=y_{n+1}-hf\left(x_{n-1},y_{n-1}\right)$
Q10.	$\int_0^{a\sqrt{3}}\int_0^{\sqrt{a^2+x^2}}\frac{xdxdy}{a^2+x^2+y^2}=$
Option A:	$\frac{\pi a}{4}$
Option B:	$\frac{\pi a}{8}$
Option C:	$\frac{\pi a^2}{4}$
Option D:	$-\frac{\pi a}{8}$
Q11.	The length of arc of the curve $y=\log\sec x$ from $x=0$ to $x=\pi/3$ is
Option A:	$\log\left(1+\sqrt{3}\right)$

Option B:	$\log\left(3+\sqrt{2}\right)$
Option C:	$\log\left(1+\sqrt{2}\right)$
Option D:	$\log\left(2+\sqrt{3}\right)$
Q12.	Value of Wronskian in the solution of D.E. $\frac{d^2y}{dx^2}+y=\sec x\tan x$ is
Option A:	0
Option B:	1
Option C:	2
Option D:	-1
Q13.	In simpson's $3/8^{th}$ rule no.of subintervalsshould be
Option A:	Odd
Option B:	Multiples of three
Option C:	Multiples of four
Option D:	even
Q14.	Changing the order of integration in double integration $\int_0^8 \int_{\frac{x}{4}}^2 f(x,y)\,dydx$ leads to $\int_r^s \int_p^q f(x,y)\,dxdy$. What is value of 'q' ?
Option A:	8
Option B:	4y
Option C:	$16y^2$
Option D:	x
Q15.	The integrating factor of $\frac{dy}{dx}+\frac{y}{x}=\frac{y^2}{x^2}$ is
Option A:	$-\frac{1}{x}$
Option B:	x
Option C:	$-x$
Option D:	$\frac{1}{x}$
Q16.	$\lceil\frac{1}{6}\lceil\frac{2}{6}\lceil\frac{3}{6}\lceil\frac{4}{6}\lceil\frac{5}{6}=$
Option A:	$\frac{3}{4}\pi^2\sqrt{\pi}$
Option B:	$-\frac{9}{4}\sqrt{\pi}$
Option C:	$4\pi^2\sqrt{\frac{\pi}{3}}$
Option D:	$4\pi^2$

Q17.	Evaluation of $\int_0^4 e^x dx$ by using Trapezoidal rule is
Option A:	57.992
Option B:	52.067
Option C:	53.864
Option D:	52.067
Q18.	Particular integral in the solution of D. E. $\frac{d^2y}{dx^2}-16y=2^x-\cos 3x$ is
Option A:	$\frac{2^x}{(\log 2)^2-16}+\frac{\cos 3x}{25}$
Option B:	$\frac{e^{x\log 2}}{(\log 2)^2+16}+\frac{\cos 3x}{7}$
Option C:	$\frac{2^x}{(\log 2)^2-16}-\frac{\cos 3x}{25}$
Option D:	$\frac{e^{x\log 2}}{(\log 2)^2+16}+\frac{\cos 3x}{25}$
Q19.	$\int_0^1\int_{y^2}^1\int_0^{1-x} xdx\,dy\,dz=$
Option A:	0.2527
Option B:	$\frac{4}{35}$
Option C:	$\frac{2}{70}$
Option D:	0
Q20.	Particular integral in the solution of D.E. $\frac{d^2y}{dx^2}-4y=x^2e^{3x}$ is
Option A:	$\frac{x^2e^{3x}}{4}$
Option B:	$e^{3x}\left(\frac{25x^2-60x+62}{125}\right)$
Option C:	$\frac{e^{3x}}{13}+\frac{x^2e^{3x}}{5}-\frac{12xe^{3x}}{25}-\frac{62e^{3x}}{125}$
Option D:	$\frac{e^{3x}}{5}\left(x^2-\frac{12x}{5}+\frac{62}{125}\right)$
Q21.	Find the volume bounded by the cone $x^2+y^2=z^2$ and paraboloid $x^2+y^2=z$.[
Option A:	$\frac{\pi}{8}$

Option B:	$\frac{\pi}{6}$
Option C:	$\frac{\pi}{3}$
Option D:	$\frac{\pi}{4}$
Q22.	Using Euler's modified method find approximate value of y at x = 0.1 in given that $\frac{dy}{dx} = x + 3y,\ y = 1$ when $x = 0, h = 0.1$.
Option A:	1.3588
Option B:	1.8556
Option C:	2.5153
Option D:	1.2158
Q23.	Solution of D.E. $(D^2 + 4)y = \cos 2x$ is
Option A:	$e^x\left[c_1 \cos 2x + c_2 \sin 2x\right] + \frac{\sin 2x}{4}$
Option B:	$c_1 \cos 2x + c_2 \sin 2x + \frac{\cos 2x}{8}$
Option C:	$c_1 \cos 2x + c_2 \sin 2x + \frac{x \sin 2x}{4}$
Option D:	$c_1 e^{2x} + c_2 e^{-2x} + \frac{x \sin 2x}{4}$
Q24.	Solution of D. E. $\left(D^2 + D\right)y = e^{4x}$ is
Option A:	$c_1 + c_2 e^{-x} + \frac{e^{4x}}{8}$
Option B:	$c_1 e^x + c_2 e^{-x} + \frac{e^{4x}}{20}$
Option C:	$c_1 + c_2 e^x + \frac{e^{4x}}{8}$
Option D:	$c_1 + c_2 e^{-x} + \frac{e^{4x}}{20}$
Q25.	The value of the integration $\int_0^\infty \int_0^\infty e^{-x\left(1+y^2\right)}\, dydx$ is
Option A:	$\frac{\pi}{8}$
Option B:	$\frac{\pi}{2}$

Option C:	$\frac{\pi}{3}$
Option D:	$\frac{\pi}{4}$