Program: FE

Curriculum Scheme: Revised 2016

Examination: First Year Semester II

Course Code: FEC201 **Course Name: Applied Mathematics-II**

Time: 1 hour Max. Marks: 50

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

Q1.	The second form of Gamma function is :
Option A:	$\lvert\overline{n} = 2\int_0^\infty e^{-x^2}.x^{2n-1}dx$
Option B:	$\lvert\overline{n} = \int_0^\infty e^{-x^2}.x^{2n-1}dx$
Option C:	$\lvert\overline{n} = 2\int_0^\infty e^{-x}.x^{n-1}dx$
Option D:	$\lvert\overline{n} = \int_0^\infty e^{-x^2}.x^{n-1}dx$
Q2.	$Evaluate \int_0^\infty \frac{x^7}{7^x}dx$
Option A:	$\frac{6!}{(log7)^8}$
Option B:	$\frac{7!}{(log8)^7}$
Option C:	$\frac{7!}{(log7)^8}$
Option D:	$\frac{6!\,7!}{(log7)^8}$
Q3.	Evaluate $\int_0^1 x^6(1-x^2)^{1/2}dx$
Option A:	$\frac{1}{4}\beta\left(\frac{7}{5},\frac{3}{2}\right)$
Option B:	$\frac{1}{2}\beta\left(\frac{7}{2},\frac{3}{2}\right)$
Option C:	$\frac{1}{2}\beta\left(\frac{9}{5},\frac{3}{2}\right)$
Option D:	$\beta\left(\frac{7}{2},\frac{3}{2}\right)$
Q4.	Evaluate $\int_0^\infty \frac{x^8(1-x^6)}{(1+x^{24})}dx$
Option A:	$\beta(9,15)$

Option B:	$\beta(8,6)$
Option C:	$\beta(24,5)$
Option D:	0
Q5.	Using DUIS Evaluate $\int_0^{\infty} \frac{e^{-x}}{x}(1-e^{-ax})dx \ , a>0$
Option A:	$log(1-a)$
Option B:	$log(1+a)$
Option C:	$log(1+a)+log(1-a)$
Option D:	$5log(1+a)$
Q6.	What is the integrating factor of the equation, $(x^2+y^2)dx-2xy\,dy=0$
Option A:	$\frac{-1}{x^2}$
Option B:	$\frac{1}{x^2}$
Option C:	$-x^2$
Option D:	x^2
Q7.	Find the solution of $(\sin x \cos y + e^{2x})\,dx + (\cos x \sin y + \tan y)\,dy = 0$
Option A:	$-\cos x \cos y + \frac{e^{2x}}{2} + \log \sec y = c$
Option B:	$\cos x \cos y + \frac{e^{2x}}{2} + \log \sec y = c$
Option C:	$\cos x \cos y - \frac{e^{2x}}{2} + \log \sec y = c$
Option D:	None of these
Q8.	Solution of the differential equation $(x+y)dx - x\,dy = 0$ is,
Option A:	$\log x - \frac{y}{x} = c$
Option B:	$\log y - \frac{y}{x} = c$
Option C:	$\log x - \frac{y}{x} = c$
Option D:	None of these
Q9.	If roots of auxiliary equation of a linear differential equation with constant coefficient are $2 \pm 3i$, 5,5,7 then the C.F. is given by,
Option A:	$e^{3x}(c_1 \cos 2x + c_2 \sin 2x) + (c_3 + c_4 x)e^{5x} + c_5 e^{7x}$
Option B:	$e^{2x}(c_1 \cos 3x + c_2 \sin 3x) + (c_3 + c_4 x)e^{5x} + c_5 e^{7x}$
Option C:	$e^{2x}(c_1 \cos 3x + c_2 \sin 3x) + (c_3 + c_4 x)e^{7x} + c_5 e^{5x}$
Option D:	None of these

Q10.	Solution of $\frac{d^3y}{dx^3} - y = 0$ is
Option A:	$(c_1 + c_2 x + c_3 x^2)e^x$
Option B:	$c_1 e^x + e^{\frac{-1}{2}x}\left(c_2 \cos\frac{\sqrt{3}}{2}x + c_3 \sin\frac{\sqrt{3}}{2}x\right)$
Option C:	Both of these
Option D:	None of these
Q11.	What is the solution of $(D+1)y = e^{-x}$
Option A:	$y = (c_1 + c_2 x)e^{-x} + e^{-x}$
Option B:	$y = (c_1 + c_2 x)e^{-x} + 0$
Option C:	$y = c_1 e^{-x} + 0$
Option D:	$(c_1 + x)e^{-x}$
Q12.	What is the P.I. of $(D+1)y = \sin x$
Option A:	$\frac{1}{2}[\sin x + \cos x]$
Option B:	$-\frac{1}{2}[\sin x - \cos x]$
Option C:	$\frac{1}{2}[\cos x - \sin x]$
Option D:	$\frac{1}{2}[\sin x - \cos x]$
Q13.	Find P.I. of $(D+1)y = e^{e^x}$
Option A:	$y = e^{-x} e^{e^x} + c$
Option B:	$y = e^{x} e^{e^x} + c$
Option C:	$y = e^{-x} e^{e^{-x}} + c$
Option D:	$y = e^{-x} e^{e^x} + c$
Q14.	Evalulate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2)\, dydx$
Option A:	4/35
Option B:	3/35
Option C:	13/35
Option D:	0
Q15.	Evaluate $\iint xy(x+y)dxdy$, where R is the region bounded by $x^2 = y$, $x = y$.
Option A:	3/56

Option B:	4/56
Option C:	13/5
Option D:	56/3
Q16.	Evaluate $\int_0^1 \int_0^x e^{x+y} dydx$
Option A:	0
Option B:	$\frac{(e-1)^2}{2}$
Option C:	$\frac{(e-1)}{2}$
Option D:	$(e-1)$
Q17.	Change to polar co-ordinate and evaluate $\int\int \sin(x^2+y^2)dxdy$ over the circle $x^2+y^2=a^2$.
Option A:	$\pi(1-cosa)$
Option B:	$\pi(1-cosa^2)$
Option C:	$\pi(1-2cosa^2)$
Option D:	$2\pi(1-cosa^2)$
Q18.	Evaluate $\int_0^1 \int_{y^2}^1 \int_0^{1-x} xdxdydz$
Option A:	35/4
Option B:	5/4
Option C:	4/35
Option D:	0
Q19.	To change cartesian co-ordinate (x,y,z) to spherical co-ordinate polar co-ordinate $(r,\theta,\emptyset)$
Option A:	$x=rsin\theta sin\emptyset$, $y=rcos\theta cos\emptyset$, $z=rcos\theta$
Option B:	$x=rsin\theta cos\emptyset$, $y=rcos\theta sin\emptyset$, $z=rcos\theta$
Option C:	$x=rsin\emptyset sin\emptyset$, $y=rsin\theta cos\emptyset$, $z=rcos\theta$
Option D:	$x=rsin\theta cos\emptyset$, $y=rsin\theta sin\emptyset$, $z=rcos\theta$
Q20.	Evaluate $\int\int\int(x^2+y^2+z^2)\, dxdydz$ over the first octant of the sphere $x^2+y^2+z^2=a^2$
Option A:	$\frac{\pi a^5}{10}$
Option B:	$\frac{\pi a}{10}$
Option C:	$\frac{a^5}{10}$
Option D:	$\frac{2\pi a^5}{10}$
Q21.	The arc length ‘s’ of the curve $y=f(x)$ from $x=x_1$ to $x=x_2$ is given by

Option A:	$s=\int_{x_1}^{x_2}\sqrt{\left(1+\frac{dy}{dx}\right)^2}\,dx$
Option B:	$s=\int_{x_1}^{x_2}\sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$
Option C:	$s=\int_{x_1}^{x_2}\sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dx$
Option D:	None of these
Q22.	If the ordinates at different points of the curve are x: 0, 0.25, 0.5, 0.75, 1 y: 1, 0.8, 0.667, 0.5714, 0.5 Then by Trapezoidal Rule, the area under the curve bounded by x-axis and ordinates at x=0 and x=1 is
Option A:	0.5782
Option B:	0.6121
Option C:	0.6970
Option D:	0.7825
Q23.	The formula for Simpson's 1/3rd Rule is given by (X:sum of extreme ordinates T:sum of ordinates multiples of 3 O:sum of odd ordinates E:sum of even ordinates R:sum of remaining ordinates)
Option A:	$\int_a^b f(x)dx=\frac{h}{3}[X+2T+3R]$
Option B:	$\int_a^b f(x)dx=\frac{h}{3}[X+3T+2R]$
Option C:	$\int_a^b f(x)dx=\frac{h}{3}[X+2O+4E]$
Option D:	$\int_a^b f(x)dx=\frac{h}{3}[X+2E+4O]$
Q24.	If $\frac{dy}{dx}=f(x,y)$ is a differential equation with initial condition $y(x_0)=y_0$, then by Euler's Method , y at x_n is obtained by the formula
Option A:	$y_n=y_{n-1}+hf(x_{n-1},y_{n-1})$
Option B:	$y_n=y_{n-1}+\frac{h}{2}f(x_{n-1},y_{n-1})$
Option C:	$y_n=y_{n-1}+hf(x_n,y_{n-1})$
Option D:	None of these
Q25.	If $\frac{dy}{dx}=1+xy\ \ with\ \ y(0)=2$ then to find the value of y(0.1) by Runge- Kutta method of Fourth Order, the value of k_2 will be
Option A:	0.1503

Option B:	0.1103
Option C:	0.2112
Option D:	0.1821