MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: **II (New)**	**Term**	: **II**	**Academic Year**	: **2017-18**
Course No.	: BS-MATH 122	**Title**	: **Engineering Mathematics – II**		
Credits	: 3 (2+1)				
Day & Date	: Wednesday, 25.04.2018	**Time**	: 9.00 to 12.00	**Total Marks**	: **80**

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Solve $2\cos(2x-y)\,dx - \cos(2x-y)\,dy = 0$

b) Test for convergence of $\frac{2^1}{1^3+1} + \frac{2^2}{2^3+1} + \frac{2^3}{3^3+1} + \cdots$

Q.2 a) Form the partial differential equation of $x^2 + y^2 = (z-c)^2 tan^2\alpha$

b) Solve $\frac{2\log(x^2+y)}{x}dx + \frac{\log(x^2+y)}{x^2}dy = 0$

Q.3 a) State the values of x, for which the series is converge $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \cdots \infty$

b) Show that the complex variable function $f(z) = |z|^2$ is differentiable only at the origin.

Q.4 a) $y = (x-a)p - p^2$

b) Test for convergence of $\frac{1}{2} - \frac{2}{5} + \frac{3}{10} - \frac{4}{17} + \cdots$

Q.5 a) Solve $(ylogx - 2)ydx - xdy = 0$

b) Find the Fourier series for $f(x) = \sin ax, \quad -\pi < x < \pi.$

Q.6 a) $\frac{d^4y}{dx^4} - 2\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 0$

b) Using the C-R equation show that $f(z) = z^3$ is analytic in the entire z-plane.

Q.7 If f(x) is a periodic function over a period $(0,2\pi)$ defined by $f(x) = \frac{(3x^2-6x\pi+2\pi^2)}{12}$.

Q.8 Solve $\frac{d^3y}{dt^3} + \frac{dy}{dt} = \cos t + t^2 + 3$

Q.9 Obtain Fourier series expansion for $f(x) = x^2 - 2 \;, \quad -2 \le x \le 2.$

Q.10 Solve $px(z-2y^2) = (z-qy)(z-y^2-2x^3)$

(P.T.O.)

SECTION "B"

Q.11 State/Define the following terms.

1) Alternating series
2) Logarithmic test
3) Cauchy-Riemann equation
4) Partial differential equations
5) Leibnitz rule for convergence
6) Dirichlet's conditions
7) Condition for exact differential equation
8) Euler's formulae

Q.12 Fill in the blanks.

1) Integrating factor of the differential equation $\frac{dy}{dx} + ycosx = \frac{sin2x}{2}$ is_____.

2) The solution of $p - q = 1$ is_____.

3) The period of a constant function is_____.

4) Imaginary part of $e^{(\frac{1}{z})}$ is_____.

5) The order of differential equation $L\frac{d^2q}{dt^2}$ +R$\frac{dq}{dt}$ + $\frac{q}{c}$ = E cos wt is _____.

6) If $(x^3 + y^3)dx - xy^2dy = 0$ is a homogeneous equation then I. F. = _____.

7) P. I. of $(D^2 + 4)y = sin3x$ is _____.

8) If $f(x) = x^2$ in $-\pi < x < \pi$ then b_n = _____.

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