

**Tula's Institute**  
**Dhoolkot, Dehradun**  
**2<sup>nd</sup> Sessional Test**

Course: B.Tech

SEMESTER- II

Branch: CSE/CE/ME/EEE/ECE

Subject with Code – Mathematics-II (BAST-105)

Session: 2019-20

Roll No. \_\_\_\_\_

Date: 14.05.2020

Time : 10-11 am

Answer sheet must be submit to: [ashish.mishra@tulas.edu.in](mailto:ashish.mishra@tulas.edu.in) and  
[lecturesandqueries@gmail.com](mailto:lecturesandqueries@gmail.com)  
(within 1 hour of exam start)

Time: 60 Mints.

Max Marks: 30

**Section A (Objective Type) (2 X 9= 18)**

**Note: Attempt all question:**

**Q1.** The value of integral  $\oint \frac{dz}{z-\pi i}$  over the contour C given by  $|z| = 2$  is:

- (a)  $\pi$  (b) 1 (c) 0 (d) 2

**Q2.** Solution of the equation:  $(D^3 - 6D^2D' + 11DD'^2 - 6D'^3)z = 0$  is:

- (a)  $z = f_1(x+y) + f_2(x+2y) + f_3(x+3y)$   
(b)  $z = f(y+x) + f(y+2x) + f(y+3x)$   
(c)  $z = f_1(y-x) + f_2(y-2x) + f_3(y-3x)$   
(d)  $z = f_1(y+x) + f_2(y+2x) + f_3(y+3x)$

**Q3.** The solution of  $\frac{\partial^2 z}{\partial x \partial y} = xy^2$  is:

- (a)  $z = \frac{x^2 y^3}{6} + f(y) + g(x)$  (b)  $z = \frac{x^2 y^2}{6} + f(y) + g(x)$   
(c)  $z = \frac{x^2 y^3}{6}$  (d)  $z = \frac{x^2 y^3}{6} + f(x) + g(x)$

**Q4.** The number of poles of  $f(z) = \frac{1}{z(z^2+3)(z^2+2)^3}$  inside the circle  $|z| = 1$  are:

- (a) 1 (b) 9 (c) 5 (d) 2

**Q5.** The residue of the function  $f(z) = \frac{z+1}{(z-1)(z-2)}$  at  $z=1$  is:

- (a) 2 (b) -2 (c) 1 (d) -1

**Q6.** The solution of the PDE:  $yq - xp = z$  is:

- (a)  $f(xy, yz) = 0$  (b)  $f\left(xy, \frac{y}{z}\right) = 0$  (c)  $f(xz, y) = 0$  (d)  $f\left(\frac{x}{z}, y\right) = 0$

**Q7.** If  $f(z)$  is analytic within and on a closed contour C, and if 'a' is any point within C, then  $\int \frac{f(z)dz}{z-a}$  is equal to:

- (a)  $f(a)$  (b)  $\frac{f(a)}{2\pi i}$  (c)  $2\pi i \cdot f(a)$  (d)  $f(0)$

**Q8.** The rule for finding the particular integral of  $(D^3 - 3D^2D' + 4D'^3)z = e^{ax+by}$  is:

- (a)  $\frac{1}{f(a^2, b^2)} e^{ax+by}$  (b)  $\frac{1}{f(-a, -b)} e^{ax+by}$   
(c)  $\frac{1}{f(a, b)} e^{ax-by}$  (d)  $\frac{1}{f(a, b)} e^{ax+b}$

- Q9.** Which of the following is **NOT** a singularity of the function:  $f(z) = \frac{1}{(z^2+1)^2(z^2+4)^2}$ ?
- (a)  $i$                       (b)  $2i$                       (c)  $2$                       (d)  $-i$

**Section B (Subjective Type) (4 X 3 = 12)**

**Note: Attempt any Three**

- Q1.** Find the general solution of  $\frac{\partial^2 z}{\partial x^2} + 3 \frac{\partial^2 z}{\partial x \partial y} + 2 \frac{\partial^2 z}{\partial y^2} = x + y$ .
- Q2.** Evaluate the integral:  $\int \frac{e^z dz}{z(z-1)^2}$  over the closed contour C, where C is the circle  $|z| = 2$ .
- Q3.** Find the general solution of:  $x(z^2 - y^2)p + y(x^2 - z^2)q = z(y^2 - x^2)$ .
- Q4.** Evaluate:  $\int_0^{2\pi} \frac{d\theta}{5-3\cos\theta}$ .