**`Practice Questions Mathematics II**

**Short Questions**

1. Evaluate the double integral:

1. Evaluate the triple integral:
2. Determine the order and degree of the differential equation:
3. Solve:
4. Find the general solution of the differential equation:
5. Determine the order and degree of the differential equation
6. Find the differential equation corresponding to the general solution given as
7. Find the general solution for the differential equation
8. Define odd and even function with examples.
9. Define odd and even function with examples.
10. If is differentiable at then show that is continuous at .
11. Express the function in the form of .
12. Define isolated singularity with example.
13. If is differentiable then show that is continuous at .
14. Find the point at which the function defined by is not analytic.
15. Find the zeros of
16. Evaluate:
17. Evaluate:
18. Evaluate: where is the circle taken in the counter-clockwise sense.
19. Determine the order and degree of the differential equation
20. Define exact differential equation with examples.
21. Find the general solution for the differential equation
22. Determine whether the function is even or odd.
23. If is differentiable then show that is continuous at .
24. Find the point at which the function defined by is not analytic.
25. Find the zeros of
26. Evaluate:
27. Evaluate:
28. Evaluate: where is the circle taken in the counter-clockwise sense.
29. Show that the function

has a simple pole at .

**Long Questions**

1. Find by double integration, the area which lies inside the cardoid and outside the circle .
2. Solve:
3. Find the orthogonal trajectories of the family of curves given by
4. Find the volume bounded by the sphere using triple integral.
5. Solve:
6. Find the Fourier transform of the function
7. Find an analytic function whose real part is .
8. Solve:
9. Find the Fourier series for the function defined by
10. Expand as a cosine series in the interval and hence show that
11. Verify Cauchy-Riemann equation for the function
12. Expand by Taylor’s series about the point .
13. Show that:

has a pole of order 2 at .

1. Find the residue of:
2. Obtain the Laurent series of the function

and hence show that

Where is the circle taken in the counter-clockwise sense.

1. Solve:
2. Find the Fourier series for the function defined by

and

1. Show that satisfy the Cauchy-Riemann equation.
2. Expand by Taylor’s series about the point
3. Solve: Solve:
4. A curve is such that the abscissa of the point of contact of tangent and the perpendicular from the origin to the tangent have equal length. Find the equation of curve.
5. State Cauchy’s Residue theorem. Using Cauchy residue theorem evaluate

where is the circle taken in the counter-clockwise sense.

1. Find the volume of the sphere
2. Solve:
3. Define trajectory. What are orthogonal trajectory? Find the orthogonal trajectories of the family of curves given by
4. Solve :
5. Find an analytic function whose real part is
6. Find the residue of at each of its poles.
7. Expand as a cosine series in the interval and hence show that
8. Solve:
9. Find the Fourier series for the function defined by

and

1. Show that satisfy the Cauchy-Riemann equation.
2. Find the Maclaurin’s expansion of
3. Solve: , when
4. A curve is such that the abscissa of the point of contact of tangent and the perpendicular from the origin to the tangent have equal length. Find the equation of curve.
5. State Cauchy’s Residue theorem. Using Cauchy residue theorem evaluate

where is the circle taken in the counter-clockwise sense.

1. Evaluate over the positive octant of the sphere
2. Solve:
3. Find the orthogonal trajectories of the family of curves given by
4. Solve :
5. Find an analytic function whose real part is
6. Find the residue of at each of its poles.
7. Obtain the half-range cosine series for in and hence show that