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| **SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR**  Siddharth Nagar, Narayanavanam Road – 517583  **QUESTION BANK (DESCRIPTIVE)**  **Subject with Code :** Mathematics-II **(18HS0831)** **Course & Branch**: B.Tech – ALL  **Year & Sem:** I-II  **Regulation:** R18 |

**UNIT –I**

1. a) Verify the Exactness of  [2M]

b) Solve [2M]

c) Solve. [2M]

d) Find the Integrating Factor (I.F) of [2M]

e) Solve . [2M]

2. a) Solve . [5M]

b) Solve [5M]

3. a) Solve . [5M]

b) Solve the D.E [5M]

4. a) Solve [5M]

b) Solve [5M]

5. a) Solve . [5M]

b) Solve . [5M]

6. a) Solve Solve . [5M]

b) Solve . [5M]

7. a) Solve . [5M]

b) Solve [5M]

8. a) Solve [5M]

b) Solve . [5M]

9. a) Solve . [5M]

b) [5M]

10. a) Solve . [5M]

b) Solve .

**UNIT –II**

1. a) Solve  [2M]

b) P.T  [2M]

c) Find Particular Integral of [2M]

d) Write the formula for Bessel’s function [2M]

e) Find the Legendre’s Polynomials . [2M]

2. a) Solve ( . [5M]

b) Solve  by method of variation of parameters. [5M]

3. a) Solve . [5M]

b) Solve  [5M]

4. a) Solve . [5M]

b) Solve  [5M]

5. a) Solve  by method of variation of parameters. [5M]

b) Solve  [5M]

6. a) Solve by method of variation of parameters . [5M]

b) Solve  . [5M]

7. Solve in series the equation [10M]

8. a) Express the following in terms of legendry’s polynomials . [5M]

b) Prove that  [5M]

9. a) Using Rodrigues’s formula P.T [5M]

b) Expressin terms of [5M]

10. Prove that . [10M]

**UNIT –III**

1. a) Evaluate . [2M]

b) Evaluate [2M] c) Change the order of integration in . [2M]

d) Evaluate  [2M]

e) Evaluate  [2M]

2. a) Evaluate [5M]

b) Evaluate  in the positive quadrant for which . [5M]

3. a) Find the area of the ellipse . [5M]

b) Evaluate  [5M]

4. a) Evaluate  [5M]

b) Evaluate  by converting to polar coordinates. [5M]

5. a) Show that the area between the parabolas and is . [5M]

b) Evaluate the integral by transforming into polar coordinates . [5M]

6. a) Calculate over the area included between the circles [5M]

b) Evaluate the integral by changing the order of integration  [5M]

7. Change the order of integration in  and hence evaluate the same. [10M]

8. a) By changing order of integration, evaluate [5M]

b) Evaluate  [5M]

9. Evaluate. [10M] 10. a) Calculate the volume of the solid bounded by the planes

. [5M]

b) Evaluate the triple integral taken through the positive octant of the

sphere . [5M]

**UNIT –IV**

**COMPLEX ANALYSIS- DIFFERENTATION**

1. a) Write Cauchy’s Riemann equations in Cartesian form. [10M]

b) Write the formula for Harmonic function.

c) Show that is analytic function.

d) Define Bilinear Transformation.

e) Write Cauchy’s Riemann equations in polar form.

1. a) Show that is Harmonic.[5M]

b) If is analytic function then prove that. [5M]

1. a) Find ‘a’ and ‘b’ if is analytic.

Hence find [5M]

b) Find the analytic function whose imaginary part is. [5M]

1. a) Determine p such that the function.[5M]

b) Find all the values of k, such that. [5M]

1. a) If is an analytic function of z and if 

Find in terms of z. [5M]

b) Find an analytic function whose real part is. [5M]

1. a) Show that f(𝑧) = 𝑧 + 2𝑧̅ is not analytic anywhere in the complex plane. [5M]

b) Show that. [5M]

1. a) Find the bilinear transformation which maps the point’s(∞,𝑖,0) 𝑖nto the points(0,𝑖,∞) . [5M]

b) Find the image of the triangular region with vertices at under the

Transformation . [5M]

1. a) Find the image of the infinite strip under the transformation . [5M]

b) Show that the function transforms the straight line in the z-plane, into a

circle in the . [5M]

1. a) Find the bilinear transformation which maps the points (∞, 𝑖, 0) 𝑖n to the points

(−1, − 𝑖, 1) in w-plane. [5M]

b) Find the bilinear transformation that maps the point’s(1, 𝑖, −1) 𝑖n to the points

(2, 𝑖, −2) in w-plane. [5M]

1. a) The image of infinite strip bounded by  under the transformation [5M]

b) Prove that the transformation 𝑤 = sin 𝑧 maps the families of lines 𝑥 = 𝑦 = 𝑐𝑜𝑛𝑠𝑡𝑎𝑛𝑡

in to two families of confocal central conics. [5M]

**UNIT –V**

1. a) State Cauchy’s theorem [2M]

b) State Cauchy’s integral formula [2M]

c) State Cauchy’s residue theorem [2M]

d) Find the poles of the function  [2M]

e) Find the residue of  [2M]

2. a) Evaluate the line integral where c consists of the line segments from

 to  and the other from  to . [5M]

b) Evaluate  along the path  . [5M]

3. Verify Cauchy’s theorem for the function  if c is the square with

vertices at  . [10M]

4. a) Evaluate using Cauchy’s integral formula  around the circle. [5M]

b) Evaluate  where using Cauchy’s integral formula [5M]

5. a) Expand  in Taylor’s series about  [5M]

b) Expand  in Taylor’s series about  [5M]

6. a) Find the Laurent series expansion of the function  in the region  . [5M]

b) Find the Laurent series of the function  about  . [5M]

7. a) Determine the poles of the function  and the residues at each pole [5M]

b) Find the residue of the function  where c is  [5M]

8. a) Evaluate . [5M]

b) Determine the poles and residues of . [5M]

9. Evaluate  . [10M]

10. Show that [10M]