

*University Institute of Engineering & Technology*  
*(Recognised Under Section 2(f) and 12B of UGC)*  
*Kurukshetra University, Kurukshetra*

<b>THEORY EXAMINATION – JULY 2021</b>	
<b>B.TECH - CSE</b>	<b>SEMESTER - IV</b>

**TIME – 4 Hrs.**

**M.M. - 75**

**PAPER-AS-201**

**SUBJECT- MATHEMATICS-III**

**INSTRUCTIONS TO BE FOLLOWED**

- The candidates will be required to attempt All questions in Part-A and Part-B (Compulsory Sections). Attempt any four questions from Part-C selecting at least one from each unit.
- Allotted time for examination is 4 hours that includes time for downloading the question paper, writing answers, scanning of answer sheets and uploading the sheets on the Attendance Sheet Cum Answer Sheet Uploading google form.
- For all CSE Reappear students, they should join the Google Meet Link and WhatsApp Link for Section-B Students for appearing in the exam and should upload their sheets in the Attendance Sheet Cum Answer Sheet Uploading Google Form meant for CSE-B regular students.
- The PDF files should be saved as Roll No. and Subject Code.
- Maximum Page Limit should be 36 (Thirty Six) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the UIET Website.
- Over-attemptation should be avoided.
- Handwriting should be neat and clean and diagrams should be clear and contrasted.
- The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.
- While attempting the paper, the candidate will use blue/black pen only.
- Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.
- Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.
- Attempt parts A, B & C separately. Do not inter-mix them. Write neatly & mention the question number clearly

**PART A (15 Marks)**

10×1.5=15

**Q. No. – 1 Answer the following questions.**

- (i) Define even and odd functions
- (ii) Define Fourier series for even function
- (iii) Check whether the function  $f(x) = x^2$  is even or odd in the interval  $(-1, 1)$
- (iv) Define Cauchy-Riemann equations
- (v) Define analytic function
- (vi) What is the chance that a leap year selected at random will contain 53 Sundays?
- (vii) If  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{3}$  and  $P(A \cup B) = \frac{1}{2}$ , evaluate  $P(A/B)$
- (viii) Find the chance of throwing 4 with an ordinary six faced die.
- (ix) Draw the graph of the linear inequation  $x + y \leq 6$
- (x) Find the chance of throwing even number with an ordinary six faced die

**Unit-B (20 Marks)**

**Q.No.2** If  $f(x) = |\cos x|$ , expand  $f(x)$  as a Fourier series in the interval  $(-\pi, \pi)$  5

**Q.No.3** Determine the analytic function whose real part is  $x^3 - 3xy^2 + 3x^2 - 3y^2$  5

**Q.No.4** A pair of dice is tossed twice. Find the probability of scoring 7 points

- (a) Once
- (b) at least once
- (c) twice 5

**Q.No.5** Using graphical method, solve the following Linear Programming Problem

Maximize  $Z = 2x + 3y$

Subject to  $x - y \leq 2$

$x + y \geq 4$

$$x, y \geq 0$$

5

### Part C(40 Marks)

#### Unit-I

**Q.No.6** Find a Fourier series to represent  $x - x^2$  from  $x = -\pi$  to  $x = \pi$ . 10

**Q.No.7** Using Parseval's identity, prove that

$$\int_0^{\infty} \frac{t^2}{(t^2 + 1)^2} dt = \frac{\pi}{4} \quad 10$$

#### Unit-II

**Q.No.8** Show that the function  $f(z) = \sqrt{|xy|}$  is not analytic at the origin even though Cauchy's Riemann equations are satisfied thereof. 10

**Q.No.9** If  $w = \phi + i\psi$  represents the complex potential for an electric field and

$$\psi = x^2 - y^2 + \frac{x}{x^2 + y^2}, \text{ determine the function } \phi. \quad 10$$

#### Unit-III

**Q.No.10** There are three bags: First containing 1 white, 2 red, 3 green balls; second 2 white, 3 red, 1 green balls and third 3 white, 1 red and 2 green balls. Two balls are drawn from a bag chosen at random. These are found to be one white and one red. Find the probability that the balls so drawn came from the second bag. 10

**Q.No.11** If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction. 10

#### Unit-IV

**Q.No.12** Using the simplex method, solve the following L.P.P

$$\text{Maximize } Z = 4x + 10y$$

$$\text{Subject to } 2x + y \leq 50$$

$$2x + 5y \leq 100$$

$$2x + 3y \leq 90$$

$$x, y \geq 0$$

10

**Q.No.13** Using graphical method, solve the following Linear Programming Problem

*Minimize*  $Z = 20x + 30y$

Subject to  $x + 2y \leq 40$

$$3x + y \geq 30$$

$$4x + 3y \geq 60$$

$$x, y \geq 0$$

10