**Enrollment No:** Exam Seat No:

## C.U.SHAH UNIVERSITY

## **Summer Examination-2019**

**Subject Name: Mathematics-II** 

**Subject Code: 4SC02MTC1 Branch: B.Sc. (All)** 

Date: 29/04/2019 Time: 02:30 To 05:30 Marks: 70 Semester: 2

**Instructions:** 

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1**Attempt the following questions:** (14)

a) Prove that 
$$cos(ix) = cos hx$$
. (02)

**b**) Solve: 
$$(D^2 - 5D + 6)y = 0$$
. (02)

c) Evaluate: 
$$\frac{1}{D^2}(x^3)$$
. (02)

d) 
$$\sin \frac{\pi}{10} \sin^{10} x \, dx$$
 (02)  
e)  $\sin \frac{\pi}{10} \sin^{4} x \cos^{4} x \, dx$  (02)

e) Find: 
$$\int_{0}^{\frac{\pi}{2}} \sin^4 x \cos^4 x \ dx$$
 (02)

f) Find polar form of 
$$1+i$$
 (01)

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$$1 + i$$
 (01)  
g) Simplify: 
$$\frac{(\cos 3\theta - i \sin 3\theta)^{4} (\cos 4\theta + i \sin 4\theta)^{-6}}{(\cos 2\theta + i \sin 2\theta)^{3} (\cos \theta - i \sin \theta)^{-7}}.$$

Attempt any four questions from Q-2 to Q-8

Attempt all questions Q-2 **(14)** 

a) Prove that 
$$\int \cos^n x \, dx = \frac{\cos^{n-1} x \sin x}{n} + \frac{n-1}{n} I_{n-2}$$
, for  $n \in \mathbb{N}$ .

**b)** Evaluate: 
$$\int_0^1 x^3 (1 - 4x^2)^{1/2} dx$$
 (04)

c) Find: 
$$\int_0^\infty \frac{x^2}{(1+x^6)^{7/2}} dx$$
 (04)

Attempt all questions Q-3 **(14)** 

**b**) Solve: 
$$x^5 + 1 = 0$$
. (05)

Find modulus and principal argument of the complex number  $\frac{1+2i}{1-(1-i)^2}$ (04)



Q-4		Attempt all questions	<b>(14)</b>
	<b>a</b> )	Prove that $\lim_{n\to\infty} \sqrt[n]{n} = 1$ .	(06)
	b)	Show that $\lim_{n\to\infty} \frac{3+5n}{n} = 5$ .	(04)
	c)	Expand $\sin^6 \theta$ in terms of cosine and sine multiple of $\theta$ .	(04)
Q-5		Attempt all questions	(14)
	a)	Show that $\log \frac{x+iy}{x-iy} = 2i \tan^{-1} \frac{y}{x}$	(05)
	b)	Prove that $\cos 5\theta = 16 \cos^5\theta - 20\cos^3\theta + 5 \cos\theta$ .	(05)
	c)	Find real and imaginary part of $tan h (x + iy)$ .	(04)
Q-6		Attempt all questions	(14)
	a)	Solve: $(D^2 - 4D + 1)y = e^{2x} \sin x$ .	(05)
	b)	Solve: $x^2 \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} + 4y = 2x^2$ .	(05)
	c)	Solve: $(D^2 - 5D + 6)y = x + e^{4x}$ .	(04)
Q-7		Attempt all questions	<b>(14)</b>
	a)	Find equation of cone whose vertex is the point $(1, 1, 0)$ and whose guiding curve is $x^2 + z^2 = 4$ , $y = 0$ .	(06)
	b)	Solve: $(D-2)^2 = e^{2x} + \cos 2x$ .	(04)
		Evaluate: $(1 + \sqrt{3}i)^{90} + (1 - \sqrt{3}i)^{90}$ .	(04)
Q-8		Attempt all questions	(14)
	a)	1	<b>(07)</b>
	b)	intersects to conic $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ ; $z = 0$ . Find the equation of the cylinder whose generators are parallel to the line $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ and whose guiding curve is $x^2 + 2y^2 = 1$ , $z = 0$ .	(07)

