Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VIII (NEW SYLLABUS) EXAMINATION- SUMMER- 2018

Subject Code: 2183612 **Date:02-05-2018**

Subject Name: Advanced Ceramics

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define Cermet with examples.	**03**
	(b)	What are the basic application areas of cermets?	**04**
	(c)	What is cermet? Give examples. What are the advantages of using cermet materials over ceramics and/ metals, explain	**07**
Q.2	**(a)**	Define carbonitride based cermet.	**03**
	(b)	Define Titanium carbide based cermet.	**04**
	(c)	Why commercial titanium carbonitride based cermets are preferred over titanium carbide based cermets ?	**07**
		OR	
	(c)	Why too little or too much chromium addition is detrimental for titanium carbonitride based cermets?	**07**
Q.3	**(a)**	Why is boron carbide so hard material?	**03**
	(b)	Describe methods of synthesis of Boron Carbide in detail.	**04**
	(c)	A strong metal-ceramic bond is essential for a satisfactory cermet production'- explain.	**07**
		OR	
Q.3	**(a)**	Describe features of cermet.	**03**
	(b)	Describe in detail the most commonly used production routes of cermets.	**04**
	(c)	Describe in detail the different preparation routes for the synthesis of titanium carbonitride.	**07**
Q.4	**(a)**	Define spontaneous polarization.	**03**
	(b)	Describe different polymorphs of $BaTiO_3$ with schematic.	**04**
	(c)	Describe methods of synthesis of Silicon Carbide in detail.	**07**
		OR	
Q.4	**(a)**	Discuss why zirconia has much toughness index.	**03**
	(b)	Describe polymorphic forms of zirconia.	**04**
	(c)	Describe the mechanism of transformation toughening in Zirconia.	**07**
Q.5	**(a)**	Define what is an implant material.	**03**
	(b)	Describe carbon based implant materials in detail.	**04**
	(c)	Define fracture toughness. Explain why does a FCC nickel crystal show a higher value of Critical Resolved Shear Stress whereas a HCP zinc crystal shows a lower value.	**07**
		OR	
Q.5	**(a)**	Define composite material.	**03**
	(b)	Describe applications of ceramic composites.	**04**
	(c)	Describe synthesis and applications of Cermet materials.	**07**

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