



Sanjay Ghodawat University, Kolhapur  
Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

Set - A

2018-19  
EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of Civil Engineering

(M. Tech. Construction

Engineering & Management)

Course Code: CEM502

Course Title: Fracture Mechanics of  
Concrete

Semester – I

Day and Date Monday  
20<sup>th</sup> May, 2019

End Semester Examination (ESE)

Time: Max Marks: 100

2:30 to 5:30 PM.

**Instructions:**

1) All question are compulsory

- Q.1 a Explain in details simple energy explanation of size effect in fracture mechanics? 12 L<sub>3</sub> CEM502.1  
b Explain in details limits of applicability in linear elastic fracture mechanics? 13 L<sub>2</sub> CEM502.2

**OR**

- Q.1 a Experimental evidence for size effect in structures? 12 L<sub>3</sub> CEM502.1  
b Explain in details energy criterion in linear elastic fracture mechanics? 13 L<sub>2</sub> CEM502.2

- Q.2 a Derive the crack band model in nonlinear elastic fracture mechanics? 12 L<sub>5</sub> CEM502.3  
b Explain effect of matrix strength and high strength concretes on fracture mechanics of concrete? 13 L<sub>4</sub> CEM502.4

**OR**

- Q.2 a Derive softening stress-displacement relations? 12 L<sub>5</sub> CEM502.3  
b What maximum nominal stress by using size effect law? 13 L<sub>4</sub> CEM502.4

- Q.3 a How to calculate of crack length and velocity in fracture mechanics of concrete? 12 L<sub>4</sub> CEM502.5  
b Explain size of the plastic zone and the validity of  $K_Q$  as plane strain fracture toughness ( $K_{IC}$ )? 13 L<sub>4</sub> CEM502.5

- Q.4 a Elaborate in brief Fracture Toughness? 12 L<sub>5</sub> CEM502.6  
b Describe testing equipment and procedure to evaluate fracture mechanics of concrete. 13 L<sub>5</sub> CEM502.6

**ESE**

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