Ref. No. EX/PG/CT/T/121/2018

M.E.CONSTRUCTION ENGINEERING FIRST YEAR SECOND SEMESTER EXAM 2018

SUBJECT : CONDITION ASSESSMENT & HEALTH MONITORING OF STRUCTURES - I

Time : Three hours **Full Marks : 100**

PART - I

Answer all questions

3+4+8+10=25

1.i) What are the basic requirements for which NDT are done?

ii)Will you ever recommend a single type of NDT for assessment of a structure or more than one type of test? If so or not-give reasons.

iii) There is a concrete wall of grid 5mtr X8 mtrs which are distressed due to several reasons. How will you plan to assess the structure quantitatively by Schmidt hammer test?

2. Explain any two of the NDT methods in brief- Schmidt hammer/UPV/Core cutting.

M. CONS. ENGG. 1ST YR. 2ND SEM. EXAMINATION – 2018

Subject : CONDITION ASSESSMENT & HEALTH MONITORING OF STRUCTURES - I

Time : Three hours (All Parts) **PART - II** **Full Marks: 25**

*Answer any **TWO** questions. Answer to all parts of the same question should be done **SERIALLY** & written together. This should be **STRICTLY ADHERED** to. Please use a **FRESH** page while answering a **NEW** question or any part of a new question. Assume any reasonable data as considered necessary. Use of fresh copies **(NOT ANNOTATED / HAND WRITTEN)** of relevant code of practice is permitted. Any methodology permitted by classical structural mechanics is permitted.*

CO4 [12.5]	[1] 'Condition Assessment' forms a new dimension to structural retrofit - Enkindle. How does it differ from Non-Destructive / Partial Destructive Testing of Concrete Structures ? Discuss with special reference to retrofit technology. [CO4] [12.5]
CO5 [12.5]	[2] Schmidt Rebound Hammer can be used as a prima facie assessment of the quantum of distress in a concrete structural system. Enumerate in the light of **IS : 13311 (Part 2) : 1992** in conjunction with **BS : 1881 : Part 202 : 1986 & ASTM C 805 : 1985.** How authentic is this test.[CO5] [12.5]
CO5 [12.5]	[3] Discuss the concept & practice of the use of Ultrasonic Pulse Velocity Test as a prima facie assessment of the quantum of distress in a concrete structural system in the light of **IS : 13311 (Part 1) : 1992.** How can this test be used in the determination of crack depth & width in a distressed bridge girder.[CO5] [12.5]
CO6 [12.5]	[3]The table given below elaborates the crushing values of various core samples from a recently collapsed flyover in Eastern India. Determine the estimated probable characteristic strength of the concrete as per the methodology enumerated in **IS : 516 : 1959 (Reaffirmed in 1999)** in conjunction with **BS : 1881 : Part 120 : 1983 & ASTM C 42 : 1990.** Can it be considered to pass a grade of **M 40** ? Give your comments in the light of relevant codes of practice. Further indicate the methodology for preparation of cores extracted before testing as per standard practice. [CO6] 12.5

Sl. No.	Test Locations at Structure Marked	Core Diameter (mm)	Capped Length (mm)	Load (kN)
1	Girder G 12-13, 0.5 M from top	90	115.0	172.29
2	Girder G 12-13, 1.5 M from top	90	158.0	176.26
3	Girder G 12-13, 2.0 M from top	90	162.0	168.58
4	Girder G 13-14, 0.5 M from top	90	158.0	183.27
5	Girder G 13-14, 1.5 M from top	90	178.0	171.29
6	Girder G 13-14, 2.0 M from top	90	169.0	182.58
7	Pier P13-13, 3.5 M from top	90	175.0	182.25
8	Pier P13-13, 2.5 M from top	90	145.0	191.36

Ref. No. EX/PG/CT/T/121/2018

M.E.CONSTRUCTION ENGINEERING FIRST YEAR SECOND SEMESTER EXAM 2018

SUBJECT : CONDITION ASSESSMENT & HEALTH MONITORING OF STRUCTURES - I

Time : Three hours **Full Marks : 100**

50 marks for each part

No of Questions	Part III	Marks
	Answer any Four Questions	
Q1.	Write a short note on load test on structures.	12.5
Q2.	Describe the non-destructive test technique based on sonic echo / Impulse response method.	12.5
Q3.	State the different considerations and activities involved in preliminary investigation of a structure.	12.5
Q4.	Briefly describe the effect of fire on concrete structures.	12.5
Q5.	Write short notes on sulphate attack in concrete structures.	12.5