

ME. CONST. ENGG. 1ST YR 2nd SEM. EXAM. - 2017**Subject Condition Assessment
and Health Monitoring of
Structures I****Time : Three hours****Full Marks : 100****Part I****Use Separate Answer scripts for each Group****Answer any four questions.**

No of Questions	Question	Marks
Q1.	Describe briefly the mechanism of corrosion and its effect in concrete structures.	12.5
Q2.	Describe the non-destructive test technique based on Impact echo method.	12.5
Q3a.	Describe briefly the stress wave propagation through concrete and its utilization in non-destructive test methods.	6.5
Q3.b.	Mention the different non-destructive test methods developed based on stress wave propagation technique.	3
Q3c.	What do you understand by ' Reflection Coefficient'?	3
Q4.a.	Write a short note on Alkali Aggregate reactions in concrete.	8.5
Q4b.	State the differences between Sonic Echo / Impulse response method and Cross Hole Sonic Logging method.	4
Q5.	Write a short note on Fire damage of concrete structure	12.5

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Structures I****Time : Three hours****Full Marks : 100****Part II****Use Separate Answer scripts for each Group****Answer Q1. and any one from the rest.**

No of Questions	Question	Mark
Q1.	At a site in some structural members (beams/columns/slabs) some deteriorations are observed. As an expert how will you start assessing the structure to conclude its health condition—explain in sequence.	12.5
Q2.a	What are the advantages and disadvantages of NDT ? Give a report format of core testing	6
Q2.b	Mention the types of NDT tests that are normally carried out .Define direct and indirect types of UPV tests with neat sketches	6.5
Q3.	Give a brief description on profometer test and carbonation test	12.5

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PART - III

Answer any *TWO* questions.

Answer all parts of the same question *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.

Discuss the significance of 'Condition Assessment'. How does it differ from Non-Destructive / Partial Destructive Testing of Concrete Structures ? Discuss with special reference to retrofit technology. 12.5

Marks

12.5 Discuss the concept & practice of the use of Schmidt Rebound Hammer as a prima facie assessment of the quantum of distress in a concrete structural system 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. 12.5

6 The table given below elaborates the crushing values of various core samples from a bridge pier. Determine the estimated probable characteristic strength of the concrete as per the methodology enumerated in IS : 516 : 959 (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. 12.5

12.5

Sl. No.	Test Locations at Structure Marked	Core Diameter (mm)	Capped Length (mm)	Load (kN)
1	Pier P34, 0.75 M from top	90	120.0	176.38
2	Pier P35, 2.0 M from top	90	170.0	175.26
3	Pier P34, 2.5 M from top	90	165.0	174.68
4	Pier P38, 0.5 M from top	90	160.0	182.23
5	Pier P42, 1.5 M from top	90	175.0	178.29
6	Pier P47, 3.0 M from top	90	171.0	188.21
7	Pier P49, 3.5 M from top	90	175.0	180.78

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 be used in the determination of crack depth & width in a distressed bridge girder. 12.5