JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

M.Tech-II Semester

COURSE CODE (CREDITS): 10M11CE215 (3) MAX MARKS: 35

COURSE NAME: SUSTAINABLE DESIGN AND CONSTRUCTION

COURSE INSTRUCTOR: Akash Bhardwaj MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	Marks
Q1	(a) Why is GGBFS preferred in marine structures and mass concreting works? (b) Explain why the use of SCMs can increase the service life of reinforced concrete structures.	3+3
Q2	(a) Evaluate the role of SCMs in achieving green building certifications and sustainable development goals. (b) A coastal structure is exposed to chloride attack. Which SCM combination would you select to improve durability? Justify your answer.	3+3
Q3	(a) Suggest suitable sustainable materials for constructing energy-efficient homes in mountainous regions. (b) Compare biodegradable materials and recyclable materials with suitable examples.	3+3
Q4	(a) Define Air Quality Index (AQI). Write its formula. Differentiate between Good AQI and Severe AQI conditions. (b) Two monitoring stations, Station A and Station B, recorded the following PM 2.5 concentrations in ambient air: • Station A: 95 $\mu g/m^3$ • Station B: 180 $\mu g/m^3$ Using the standard Air Quality Index (AQI) calculation method: 1. Determine the AQI values for both stations. 2. Identify the corresponding air quality category for each station. 3. Compare the air quality of the two stations and determine: o Which station has more polluted air o The difference between their AQI values 4. Discuss which station poses a greater threat to human health and provide justification based on AQI classification.	4+5

Q5	(a) Draw a Solar Chimney and show airflow pattern. How would you integrate a Solar Chimney in a commercial building? (b) During demolition of buildings, mixed debris is generated and recycling becomes difficult. Suggest a better waste management approach for C&D waste.	4+4

PM 2.5 AQI Breakpoint Table (India – CPCB)

PM 2.5 Concentration ($\mu g/m^3$)	AQI Range
0 – 30	0 – 50
31 – 60	51 – 100
61 – 90	101 – 200
91 – 120	201 – 300
121 – 250	301 – 400
> 250	401 – 500