JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-VIII Semester

COURSE CODE (CREDITS): 21B1WCE831 (3) MAX. MARKS: 15

COURSE NAME: DISASTER RISK ANALYSIS AND MANAGEMENT

COURSE INSTRUCTORS: DR. SAURAV MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

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

(c) Use of Non programmable calculator is allowed.

Q.No	Question	CO	Marks
Q1	Explain the outcome and overall goal of the Sendai Framework for Disaster Risk Reduction (SFDRR). Enumerate its four priorities for action and its seven global targets. Discuss how SFDR is aligned with India's disaster management laws and plans including the Disaster Management Act 2005 and the National Disaster Management Plan (NDMP) 2016.	2	5
Q2	Explain the different dimensions of vulnerability in the context of disasters and discuss specific measures to reduce each of these dimensions. Assuming the role of a disaster management expert, describe the vulnerability reduction strategies you would prioritize for a multi-hazard-prone district, giving reasons for your choices.	1	4
Q3.	Consider a river embankment flood protection project for a major Indian city with two alternative designs:	2	6

Option A (High safety design)	Option B (Moderate safety design)
Design return period: 1 in 1,000-year flood Construction cost: INR200 crore If the embankment fails or is overtopped, estimated direct and indirect loss: INR8000 crore	Design return period: 1 in 200-year flood Construction cost: INR120 crore If the embankment fails or is overtopped, estimated direct and indirect loss: INR5000 crore

Assume a project life of 50 years

a) Compute the Expected Annual Loss (EAL) for both options.

b) For each option, compute the "Equivalent Annual Cost" (EAC)

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	c) On purely economic grounds, which option is preferable? d) Interpret your result from a disaster-risk-management perspective, comparing the ideas of "designing for very low residual risk with high upfront cost" versus "optimizing for acceptable risk with lower initial investment." e) Now suppose you are designing a new flood-control project where decision-makers will accept at most 7% probability that the design flood will be exceeded at least once during the 30-year life of the project.		
	i. Determine the annual exceedance probability and corresponding return period you would adopt in the design. ii. Assuming independent annual flood events and using the binomial model, compute the probability that exactly one flood exceeding the design capacity will occur during the 30-year life of the project.		