M.E. CONSTRUCTION ENGG 2ⁿᵈ YEAR 2ND SEMESTER EXAMINATION, 2024

Repair & Retrofitting Technique – II,

Time : Three hours   Full Marks : 100

(50 marks for each Part)

(Use sepatate Answer Script for each Part)

PART I (50 Marks)

Answer any **Two questions**.

Explain your answer with neat sketches if necessary.

No Codes are allowed

1. a) Discuss **'Push-Over Analysis'** indicating its objectives in the context of seismic retrofitting of structure? What are the expected **outcomes** of the analysis?   **10**

    b) Discuss Capacity & Demand Spectrum and **Performance point** of a structure and its significance.   **10**

    c) Discuss **Seismic hazard levels** and **Performance objectives** of structures?   **5**

2. a) Define **Disaster** and **Mitigation** from Engineering perspective   **4**

    b) Discuss the **three 'P'** concept of **Disaster Mitigation** and their **role** on the three major **disasters** in India e.g. **Earthquake, Cyclone** and **Flood.**   **6**

    c) Discuss **Base Isolation Technique** for **Retrofit of old existing buildings**?   **8**

    d) Compare between **Conventional techniques** and **Base isolation technique** for **Retrofitting** of existing buildings.   **7**

1. a) Define **Seismic Evaluation** and **discuss** in the context of **RCC** buildings?   **8**

    b) Discuss on **Strength-Related** checks under **preliminary evaluation** for RCC frame under seismic demand ?   **8**

    c) Discuss on **seismic retrofit** of **Walls** by the following

    i) **R C Coating** of brick walls.

    ii) **Re-pointing** of walls   **5 X 2 = 10**

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M.E Construction Engineering 2nd year 2nd semester Examination 2024

Repair &Retrofitting technique-II   Part-II (50 Marks)

Answer any two questions

Assume relevant data if required

Q-1(a) Estimate the thickness of thin white topping required for a bituminous road pavement in DumDum having K= 9 Kg/cm^3 with a present traffic of 165A cvpd., where A = last digit of your examination roll number.   (15)

(b) If the pavement carries 10% of its total load as tandem axle with an axle load within a range of 22-24 ton , then estimate the fatigue life of overlay against fatigue. (10)

Q-2. (a) Define rebound and characteristic deflection in overlay design. Discuss the significance of temperature and moisture correction in rebound deflection measurement. (8)

(b) If the recorded roughness of a road was found as 3000 mm /km , then estimate the IRI value and PSR of the road section. Indicate how is the serviceability of the road in terms of AASTHO guideline. (7)

© Explain the significance of road roughness in condition monitoring of road pavement. (5)

(d) Explain why expansion or contraction joints are not used in bituminous road pavement though used in concrete roads. (5)

Q-3(a). A bituminous road section has been shown in Fig-1 which has been designed considering 8okN standard axle load with 0.56 MPa tyre pressure . Estimate the service life of the pavement against rutting as well as fatigue. (20)

(b) Discuss the significance of lane distribution factor with reference to service life of bituminous road pavement. (5)
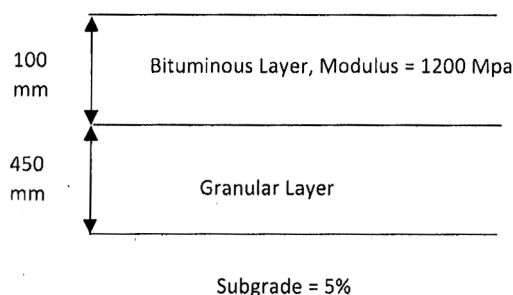
100 mm — Bituminous Layer, Modulus = 1200 Mpa

450 mm — Granular Layer

Subgrade = 5%

Fig.1.