

Seat No. **MAR-APR-2024 SUMMER EXAMINATION****Bachelor of Engineering****Sub. Name: Earthquake Engineering****Sub. Code: 67559/83733/84013****Day and Date: MAY ,04-05-2024****Total Marks: 70****Time: 10:30 AM To 01:00 PM**

- Instructions:**
1. All questions are compulsory
 2. Assume suitable data wherever necessary and mention it boldly
 3. Draw neat labeled diagrams wherever necessary
 4. Figures to the right indicate full marks
 5. Use of calculator and statistical table is allowed

Special Inst.: Use of IS 1893_2016 (part-I) is permitted.

- Q1) Attempt any one Question [7]**
1. Write a note on Modified Mercalli Scale (MMS) [7]
 2. Differentiate S wave & Love wave with neat sketch [7]
- Q2) Attempt any two questions [14]**
- a. Derive the equation of motion and its solution for forced undamped vibration system [7]
 - b. What do you understand by Dynamic Magnification Factors? [7]
 - c. Explain the phenomenon of resonance [7]
- Q3) A four storied square RC framed residential building as shown in Fig.1 with live load [14]**
 4kN/m^2 is to be constructed on hard soil strata in zone V. Determine the seismic forces on the structure by seismic coefficient method using IS 1893 part (I). All beams and columns size $300\text{mm} \times 450\text{mm}$. Thickness of roof and floor slab 120mm . Wall is of 230mm thick all around. Height of each floor is 3m . Density of concrete 25kN/m^3 and masonry 20kN/m^3 . Assume 5% damping

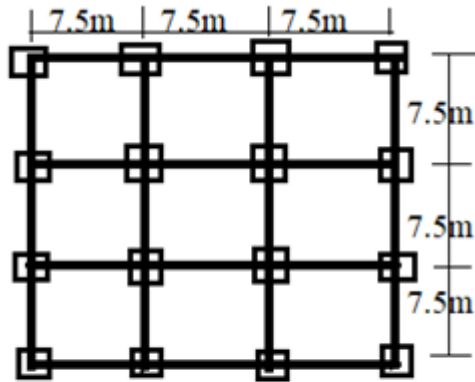


Fig.1 Q3-Plan of Building

Q4) Attempt any two [12]

1. Simplicity and symmetry is the key to making a building earthquake resistant. Explain [6]
2. Explain phenomena liquefaction and write remedial action taken to avoid liquefaction effect? [6]
3. Explain in brief principles of earthquake resistant design of RCC member? [6]

Q5) Attempt all questions. [12]

- a. Explain failures of masonry structures observed in past earthquakes & how will you improve performance of masonry building [6]
- b. What is jacketing? Explain the jacketing of column with illustrative sketch [6]

Q6) Attempt all questions [11]

- a. Explain energy dissipation devices to improve Earthquake resisting building structure [6]
- b. Explain Friction Damper System and Mechanism? [5]

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Seat No.

MAR-APR-2024 SUMMER EXAMINATION**B.Tech. CBCS****Sub. Name: Design of Concrete Structures-I****Sub. Code: 67558/83732/84012****Day and Date: MAY ,03-05-2024****Total Marks: 70****Time: 10:30 AM To 01:00 PM**

- Instructions:**
1. All questions are compulsory
 2. Assume suitable data wherever necessary and mention it boldly
 3. Draw neat labeled diagrams wherever necessary
 4. Figures to the right indicate full marks

Special Inst.: Use of IS 456-2000 is allowed

- Q1)** a) Find X_{max} , $P_{t,lim}$, and $M_{u,lim}$ for Fe250 and M20 grade concrete. (6) [12]
 b) Explain the following (6)

- i) Characteristic Strength
- ii) Partial Safety Factors.

- Q2)** Design a balanced reinforced concrete beam section for an applied moment of 48kN-m. [12]

The width of beam is limited to 150mm. Use M20 Concrete and Mild Steel Grade-I

OR

Find reinforcement required for a doubly reinforced beam section to the following data,

Width of beam -250mm

Depth of beam to the centre of compression steel -500mm

Effective cover to the centre of compression steel -50mm

Max BM under working load condition -120kN-m

Safety Factor-1.5

Use M15 concrete & Fe250 steel.

- Q3)** A RC beam 230mm wide 450mm deep is reinforced with 3-16mm Φ of grade Fe415 [11] on tension side with an effective cover of 50mm. Design the vertical shear reinforcement when full tension steel is available for ultimate SF of 80kN.

- Q4)** Design a simply supported slab over a class-room of size 5m \times 10m. A finishing [12] surface of cement concrete of 20mm shall be provided over the slab. The slab shall be used as a class-room floor. M15 grade of concrete and mild steel reinforcement shall be used.

OR

The overall dimensions of dog-legged stair are 4750mm \times 2400mm with landing of

1125mm . The landing slab spans in the same direction as the stair and are supported by the walls at the ends. Design the stair slab. Provide M20 grade of concrete and HYSD-Steel bars of grade Fe415. The stair is used inside a residential building.

- Q5)** A short RCC column 400mm × 400mm is provided with 8-16mm Φ . If the effective [12] length of column is 2.25m. Find ultimate load for the column. Use M15 concrete Fe250 Steel.
- Q6)** Design an isolated rectangular sloped footing for the column of size [11] 230mm×650mm, reinforced with 6-20mm Φ and carrying an axial load of 1200kN. The bearing capacity of the soil is 300kN/m². Use concrete grade M20 and steel grade Fe415. Effective cover for bottom steel is 60mm. take offset from the face of the column equal to 50mm.

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Seat No.

MAR-APR-2024 SUMMER EXAMINATION**B.Tech. CBCS****Sub. Name: Earthquake Engineering****Sub. Code: 67559/83733/84013****Day and Date: MAY ,04-05-2024****Total Marks: 70****Time: 10:30 AM To 01:00 PM**

- Instructions:**
1. All questions are compulsory
 2. Assume suitable data wherever necessary and mention it boldly
 3. Draw neat labeled diagrams wherever necessary
 4. Figures to the right indicate full marks
 5. Use of Scientific calculator is allowed

Special Inst.: Use of IS 1893_2016 (part-I) is permitted.

- Q1) Attempt any one** [7]
- a. Explain plate tectonic theory with neat sketch [7]
 - b. Explain seismic waves with schematic diagrams [7]
- Q2) Attempt any two questions** [14]
- a. Derive the equation for logarithmic decrement [7]
 - b. Explain the phenomenon of resonance [7]
 - c. A spring mass (k_1, m_1) system has a natural frequency f_1 . Calculate the Value of stiffness of other spring which when connected to k_1 in series decreases the frequency by 50%. [7]
- Q3) A four storied square RC framed residential building as shown in Fig.1 with [14]**
live load 4kN/m^2 is to be constructed on hard soil strata in zone V. Determine the seismic forces on the structure by seismic coefficient method using IS 1893 part (I). All beams and columns size $300\text{mm} \times 450\text{ mm}$. Thickness of roof and floor slab 120 mm . Wall is of 230 mm thick all around. Height of each floor is 3m . Density of concrete 25kN/m^3 and masonry 20kN/m^3 . Assume 5% damping

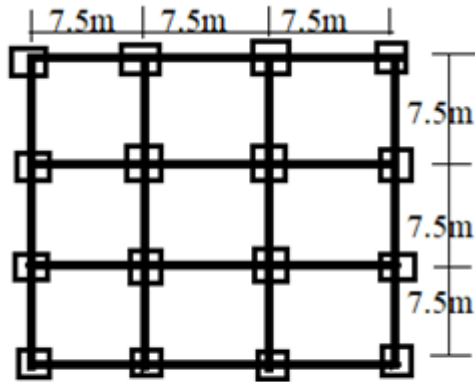


Fig.1 Q3-Plan of Building

Q4) Attempt any two question [12]

- a. Explain soft storey & discuss its performance of soft storey building in past earthquakes. How will you avoid soft storey? [6]
- b. How does ductility affect overall behavior of the building? [6]
- c. Explain the concept of strong column and weak beam? [6]

Q5) Attempt all questions [12]

- a. What is jacketing? Explain the jacketing of beams with illustrative sketches [6]
- b. Define RC band? At what level in a masonry building would you provide them? Why? [6]

Q6) Attempt all questions [11]

1. Explain active control system and passive control system [6]
2. Explain with sketch Viscous fluid dampers. [5]

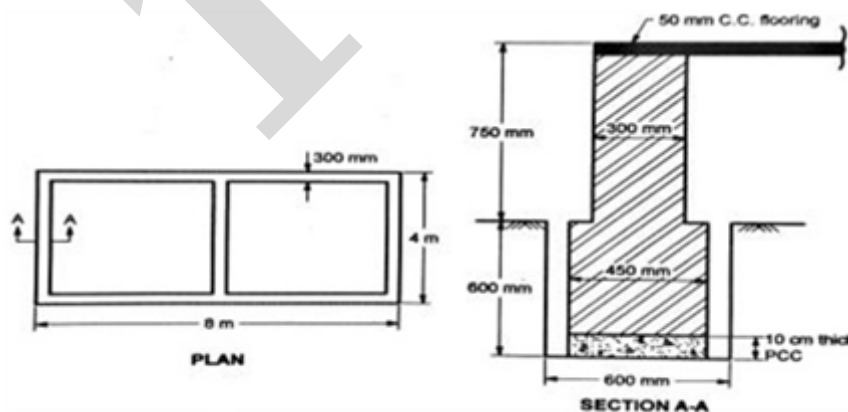
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Seat No. **MAR-APR-2024 SUMMER EXAMINATION****B.Tech. CBCS****Sub. Name: Quantity Survey and Valuation****Sub. Code: 67560/83734/84014****Day and Date: MAY ,09-05-2024****Total Marks: 70****Time: 10:30 AM To 01:30 PM**

Instructions: 1. Assume suitable data wherever necessary and mention it boldly
 2. Figures to the right indicate full marks
 3. Use of calculator and statistical table is allowed

Special Inst.: Questions No. 3 is compulsory. Attempt any 2 questions from remaining in Section I and any 3 questions from Section II.

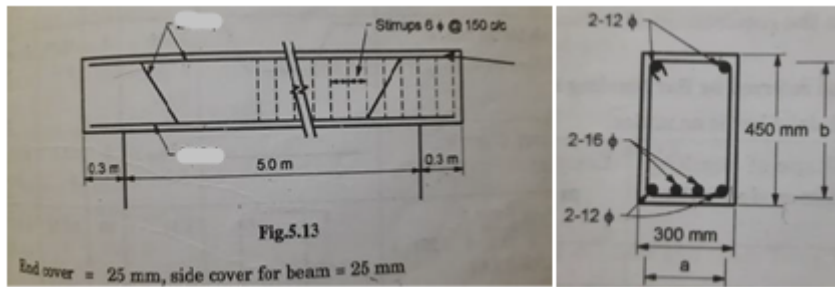
- Q1)** a) Write down the Mode of measurement with reason in short as per the following: [10]
 i) Partition Wall ii) 12 mm thick cement plastering iii) fencing iv) Stone masonry v) Door Frames
 b) What is IS 1200? Write rules for deduction for plastering work as per code
- Q2)** a) What is meant by Task work? Explain its importance in rate analysis with suitable [10] examples.
 b) Write detailed specification on UCRM (1:4)
- Q3)** a) The plan and section of building is shown below prepare quantity estimate for the [12] following items of work.
 1. Earth work in Excavation, 2. Earth work in plinth filling ,
 3. First class Brick work in cement mortar (1:6) for foundation and plinth, 4. 2.5 cm thick D.P.C.



- Q4)** Write Short Note on (Any TWO) [10]
 a) Provisional sum and Provisional quantities.
 b) Measurement sheet and abstract sheet.
 c) Standard schedule of rate.

Q5) SECTION II

Work out the quantity of steel for the beam as shown below:



- Q6) a) Explain Price, cost and value with examples [6] [11]
 b) What is mean by valuation? What are factors affecting valuation of Property. [5]
- Q7) a) A Building Stands on a freehold plot of land measures 600 sqm yields a gross rent [12]
 of Rs. 1000 per month. The price of land is Rs. 75/m². The estimated future life of
 the building is 12 years, but is expected to extend by another 16 years. If structural
 and other repairs costing Rs. 16,000/- are immediately carried out. The total amount
 of outgoings is 25 % of the gross rent. The owner requires 7% return on land and
 11% return on building with 6 % for redumption of capital. Find out whether it will
 be advisable to spend the above cost and 26 years of capital. Find out whether it will
 be advisable to spend the above cost of repairs from investment point of view. [9]
 b) Different types of values [3]
- Q8) Write Short Note on (Any Two) [12]
 a) Building lease and Occupation lease.
 b) Capitalized value and year purchase.
 c) Explain a note on bar bending schedule.

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Seat No.

MAR-APR-2024 SUMMER EXAMINATION

Bachelor of Engineering

Sub. Name: Design of Concrete Structures-II

Sub. Code: 67748/84745/84930

Day and Date: MAY ,03-05-2024

Total Marks: 70

Time: 02:30 PM To 05:00 PM

Instructions:

1. All questions are compulsory
2. Assume suitable data wherever necessary and mention it boldly
3. Use of Scientific calculator is allowed

Special Inst.: Use of I.S.: - 456 Code is allowed.

- Q1)** Design the reinforcement required for a rectangular beam section having width [12] 300mm and over all depth 600mm. with effective cover 45mm. This beam is subjected to Ultimate Bending Moment of - 75KNm, Ultimate Shear Force -80KN and Ultimate Torsional Moment – 50KNm. Use M15 grade Concrete and Fe 415 grade steel.
- Q2)** A reinforced concrete beam continuous over two equal spans of length 5m each. It is [11] simply supported at its ends. It carries udl Live Load of 20KN/m over entire length. Design the beam for flexure. Use M20 grade Concrete and Fe415 Grade of Steel.
- Q3)** Design R C C rectangular Water tank resting on ground, for plan dimension of 4m X [12] 3m and height of water is 3m and free board of 0.3m. Use M20 grade concrete and Fe415 steel.
- OR
- Design a Circular Water tank with fixed base for 5 lakes liter capacity. The height of the tank is 4m. The walls of the tank are free at top . Use M20 grade Concrete and Fe415 Grade of Steel.
- Q4)** **Solve any Two of the following -** [12]
- i) Draw different Cable profiles and explain their suitability for different loading condition.
 - ii) Explain in details different types of prestressing
 - iii) Why high strength steel and high strength concrete is required for prestressing
- OR**
- A Simply supported concrete prestressed beam of cross section 200mm wide X 600mm deep is loaded with udl of 20KN/m, including self wt. over a span of 6m. Find the stresses at mid span and end span section. If the prestressing force is 960KN and the tendons are placed at 150mm constant eccentricity below the centroidal axis
- Q5)** A pretensioned prestressed concrete beam of 10m span has a cross section of 250mm [11]

X 250mm contains 60 wires each of 2mm dia. Uniformly distributed over the section. The wires are initially tensioned on the prestressing bed with a total force of 300KN. Calculate the % loss of prestress. Take – $E_s = 210000\text{N/mm}^2$, $E_c = 32000\text{N/mm}^2$, Shrinkage strain – 0.0002, Creep Coefficient – 1.4, Relaxation of Steel -4 %.

Q6) Design a rectangular prestressed concrete beam to support a dead load moment of [12] 15KNm including its own weight and a live load moment of 40KNm at its mid span.

Take –

i) Allowable initial compressive stress in concrete – 17N/mm^2 .

ii) Allowable final compressive stress in concrete – 14N/mm^2 .

iii) Allowable initial and final tensile stress in concrete – 1N/mm^2 .

iv) Permissible tensile stress in steel – 1000N/mm^2 .

v) Assume loss of prestress – 15%

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Seat No. **MAR-APR-2024 SUMMER EXAMINATION****Bachelor of Engineering****Sub. Name: Water Resources Engineering - II****Sub. Code: 67749/84746/84931****Day and Date: MAY ,09-05-2024****Total Marks: 70****Time: 02:30 PM To 05:00 PM**

- Instructions:**
1. Assume suitable data wherever necessary and mention it boldly
 2. Draw neat labelled diagrams wherever necessary
 3. Figures to the right indicate full marks
 4. Use of Scientific calculator is allowed

Special Inst.: Question no.4 and 8 is compulsory. Solve any two questions from question no.1,2 and 3 and solve any two questions from question number 5,6 and 7.

- Q1)** a) Which are the factors affecting selection of site of reservoir? (5) [10]
b) Which are the causes of failure of earthen dams? (5)
- Q2)** a) Which are the modes of failure of gravity dam? (5) [10]
b) What is high dam and low dam ? (5)
- Q3)** a) Describe selection criteria of spillways? (5) [10]
b) What is Energy dissipation? Explain types of energy dissipation work? (5)
- Q4)** Write short notes on (Solve any three) [15]
a) Practical profile of gravity dam (5)
b) Reservoir Sedimentation (5)
c) Storage zones and control levels in reservoir (5)
d) Side Channel Spillway (5)
- Q5)** a) Explain various causes of failure of weir ? (5) [10]
b) Explain Lanes weighted creep theory detail. (5)
- Q6)** a) What is the necessity of canal lining ? Also justify economics of canal lining? (5) [10]
b) What is canal fall ? Explain any two types in detail ? (5)
- Q7)** a) Write in detail about Meandering- causes, factors controlling process and features [10]
?
b) Give classification of hydropower plants ?
- Q8)** Write short notes on:(Solve any three) [15]
a) Aqueduct and Siphon aqueduct (5)
b) Types of Weirs (5)

- c) Super passage (5)
- d) Types of Groynes (5)

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Seat No.

MAR-APR-2024 SUMMER EXAMINATION**B.Tech. CBCS****Sub. Name: Design of Concrete Structures-II****Sub. Code: 67748/84745/84930****Day and Date: MAY ,03-05-2024****Total Marks: 70****Time: 02:30 PM To 05:00 PM**

Instructions:

1. All questions are compulsory
2. Assume suitable data wherever necessary and mention it boldly
3. Use of Scientific calculator is allowed

Special Inst.: Use of I.S.: - 456 Code is allowed.

- Q1)** A rectangular beam 300mm wide X 400mm overall is reinforced with 2 no. of 12mm [12] dia. bars at top and 2 no. of 16 mm dia. bars at bottom each provided with an effective cover of 40mm. Determine the resistance of beam in pure torsion. Use M20 grade of concrete and Fe415 grade of steel.
- OR
- Design the reinforcement required for a rectangular beam section having width 350mm and over all depth 700mm, with effective cover of 50mm. Beam is subjected to Ultimate Bending Moment – 200KNm, Ultimate Torsional Moment – 75KNm and Ultimate Shear Force – 120KN. Use M20 grade of concrete and Fe415 grade of steel.
- Q2)** A continuous beam ABCD is simply supported at A and B and is continuous over [12] supports B and C. The spans of the beam are $L(AB) = L(CD) = 4.0\text{m}$ and $L(BC) = 4.5\text{m}$. The beam carries a live load of 15KN/m and a dead load of 20KN/m. By using IS code provisions design the beam for flexure
- Q3)** Design a suitable circular water tank resting on ground with flexible base for a [11] capacity of 4 lakes liter. Use M20 grade of concrete and Fe415 grade of steel.
- Q4)** A simply supported prestressed concrete beam of cross section 200mm wide X [12] 300mm deep is loaded with live load of 6KN/m over a span of 6m in addition to self weight. The beam is prestressed by prestressing force of 280KN, at an eccentricity of 50mm below the centriodial axis. Take unit weight of concrete as 25KN/m³. Find the stresses at extreme fibers at mid span section When -
- i)The beam is subjected to self weight only. And
 - ii) The beam is subjected to self weight and live load
- Q5)** A post tensioned beam 150mm X 300mm is having parabolic cable consisting of 12 [11] wires of 5mm dia. The cable having eccentricity of 50mm at mid span and zero at ends. The initial stress in steel is 1000N/mm². Find the total % loss of prestress.

Take – i) The span -10m, ii) μ - 0.35/rad. iii) k – 0.0015/m,
iv) Relaxation of steel – 3%, v) E_c – 35000 N/mm², vi) E_s – 210000 N/mm²,
vii) Creep coefficient – 2.5, viii) Shrinkage strain - 0.0002

Q6) Design a prestressed concrete beam to the following data –

[12]

- i) Span – 9m, ii) Live Load – 25 KN/m,
- iii) Allowable initial compressive stress in concrete – 17.5N/mm²,
- iv) Allowable final compressive stress in concrete – 14N/mm².
- v) Allowable initial and final tensile stress in concrete – 1N/mm².
- vi) Assume loss of prestress – 20 %,
- vii) Safe stress in steel - 1000 N/mm²

OR

Solve any Two of the following –

- i) Why high strength steel and high strength concrete is required for prestressing.
- ii) Explain in detail all the three concepts used for the analysis of prestressed concrete section.
- iii) Explain Merits and Demerits of prestressed concrete

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