MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
M.Tech. III Semester End Examinations
(Model Question Paper)

MR-21

Course Title: Earthquake Resistance Design of Buildings (PE-V) **Course Code: CE311PE**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Write a short notes on Seismograph	2	3	1	3, 6
1. b)	Distinguish between Primary waves and Secondary waves.	2	4	1	3, 6
	Unit-II				
1. c)	Explain the choice of construction material in earthquake resistance design	2	2	2	3, 6
1. d)	What are the reasons for torsion in buildings? How is it reduced?	2	1	2	3, 6
	Unit-III				
1. e)	Explain vertical irregularities in multi storied buildings and their effect on seismic behaviour of such buildings	2	2	4	3, 6
1. f)	Define structural walls. How are they classified?	2	1	4	3, 6
	Unit-IV				
1. g)	Discuss the concept of flanged shear walls.	2	6	3	1, 3, 6
1. h)	List the general requirements of a shear walls.	2	4	3	1, 3, 6
	Unit-V				
1. i)	Explain the concept of capacity design	2	2	5	1, 3, 6
1. j)	Explain the factors affecting ductility	2	2	5	1, 3, 6

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain, with suitable examples, the effect of discontinuities in load path affecting the performance of RC buildings during earthquakes.	5	2	1	3, 6
2. b)	Distinguish between earthquake magnitude and intensity and also explain the various types of earthquake magnitude scale.	5	4	1	3, 6
	OR				
2. c)	How seismic waves are induced? Explain the different types of seismic waves	5	1	1	3, 6
2. d)	Explain fault, dip, slip and their role in formation of earthquakes	5	2	1	3, 6
	Unit-II				
3. a)	Explain time response spectrum method in the analysis of earthquake resistant structures	3	2	2	3, 6
3. b)	A three storied hospital building located in Ahmedabad resting on medium soil is analyzed for free vibration and the results are as mentioned. W1 = 1100kN, W2 = 1300kN and W3 = 1000kN. ω1 = 8.3407 rad/sec. ω2 = 23.2831 rad/sec and ω3 = 31.5954 rad/sec. The three corresponding mode shapes are {0.2980, 0.5977, and 0.7443}, {0.6623, 0.3535, -0.6607} and {0.7031, -0.6237, 0.3415}. Calculate the storey shears by the dynamic analysis.	7	4	2	3, 6
	OR				
3. c)	The plan and elevation of three-stored RCC school building is shown in Fig.1. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment-resisting frame. The intensity of DL is 10kN/m2 and the floors are to cater to an IL of 3kN/m2. Determine the design seismic loads on the structure by static analysis. Fig. 1 Building configuration	7	3	2	3, 6

		M	L	CO	PO
3. d)	If a building is to be constructed on the slope of a hilly area, list the precautions which we need to exercise during planning of the building to avoid twisting?	3	4	2	3, 6
Unit-III					
4. a)	State the common earthquake damages in non-structures? What measures do you suggest to prevent them?	5	1	4	3, 6
4. b)	Explain the analysis of infill wall using equivalent diagonal strut for infill with and without openings	5	2	4	3, 6
OR					
4. c)	Explain the role of horizontal bands in masonry structures subjected to earthquake. Name the various horizontal bands.	5	2	4	3, 6
4. d)	Explain the procedure for lateral load analysis of masonry buildings	5	2	4	3, 6
Unit-IV					
5. a)	Derive a formula for moment of resistance of rectangular shear walls	5	3	3	1, 3, 6
5. b)	Explain the behaviour of coupled shear walls	5	2	3	1, 3, 6
OR					
5. c)	Why are Buildings with Shear Walls preferred in Seismic Regions?	5	1	3	1, 3, 6
5. d)	Discuss the concept of flanged shear wall.	5	6	3	1, 3, 6
Unit-V					
6. a)	Describe the importance of ductility in earthquake resistant design.	3	2	5	1, 3, 6
6. b)	Design a rectangular beam for 10 m span to support a DL of 15kN/m and a LL of 10kNm inclusive of its own weight. Moment due to earthquake load is 650 kNm and shear force is 100kN. Use M25grade concrete and Fe415 steel.	7	3	5	1, 3, 6
OR					
6. c)	Explain about ductile detailing of beam column joint in a RCC building as per IS 13920	5	2	5	1, 3, 6
6. d)	Draw the ductile detailing provisions of beams of an RC building as per the IS code of practice and also explain the salient features	5	4	5	1, 3, 6

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

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MR-21

Course Title: Energy from Waste   **Course Code: EE321OE**

Time   : 3 hours   Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	What are the different conversion devices for MSW ?	2	1	1	1
1. b)	Explain the composition of MSW ?	2	2	1	1
	Unit-II				
1. c)	What are the types of pyrolysis?	2	1	2	2
1. d)	Identify the yields in pyrolysis plant?	2	3	2	1
	Unit-III				
1. e)	What are the different types of gasifiers?	2	1	3	1
1. f)	Write the equilibrium and kinetic considerations in gasifier operation?	2	2	3	3
	Unit-IV				
1. g)	Which factors will affect combustion process?	2	1	4	1
1. h)	compare the difference between pyrolysis and combustion?	2	4	4	2
	Unit-V				
1. i)	What is anaerobic digestion process?	2	1	5	1
1. j)	Write the equations for alcohol production from biomass?	2	2	5	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Classify the thermochemical energy conversion technologies for MSW?	7	4	1	1
2. b)	How the waste is classified for energy generation?	3	2	1	1
	OR				
2. c)	What is the importance of solid waste management?	4	1	1	1
2. d)	Examine about biomass resources and their classification?	6	4	1	1
	Unit-II				
3. a)	Explain biomass pyrolysis process ?	6	1	2	1
3. b)	What are the pyrolytic oils and gases yields of pyrolysis?	4	1	2	1
	OR				
3. c)	Describe the preparation of charcoal from pyrolysis process?	5	1	2	1
3. d)	Compare different pyrolysis types?	5	4	2	2
	Unit-III				
4. a)	How to utilize the gasifier engine arrangement for electrical power generation?	5	3	3	1
4. b)	Analyse about the different designs of gasifiers?	5	2	3	2
	OR				
4. c)	Explain the design and construction of fixed bed gasifier with neat diagram?	5	2	3	1
4. d)	Write about Gasifier burner arrangement for thermal heating	5	1	3	4
	Unit-IV				
5. a)	Examine the working principle and operation of circulating fluidized bed combustor with neat diagram	6	4	4	3
5. b)	What are the considerations for the biomass stove?	4	3	4	1
	OR				
5. c)	Discuss different grate type combustor?	4	1	4	2
5. d)	Explain about the improved challahs with traditional stoves.	6	5	4	1
	Unit-V				
6. a)	Analyse the process of extraction of bio diesel from biomass and give the applications?	5	2	5	3
6. b)	Compare gasification and combustion process?	5	5	5	2
	OR				
6. c)	Explain the floating drum type bio gas plant in detail.	6	2	5	3
6. d)	List the properties of bio gas?	4	2	5	2

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