22ES14B

USN | | | | | | | | | | |

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I Semester B. E. ExaminationsMay-2023

Common to AI / AS/ BT / CH / CS / CY / CD / EC / EE / EI / ET / IM / IS / ME

ELEMENTS OF CIVIL ENGINEERING (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B.In Part B question number 2is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8 & 9 and 10.

PART-A

1	1.1	State principle of transmissibility of forces.	02
	1.2	State Varignon's theorem.	02
	1.3	What do you mean by $PCC$and RCC?	02
	1.4	What is built-up area?	02
	1.5	List different types of solid waste.	02
	1.6	List any two benefits of smart buildings.	02
	1.7	Describe different modes of transportation.	02
	1.8	List the different rail gauges used in railways.	02
	1.9	What is weathering of rocks?	02
	1.10	Define shallow and deep foundation.	02

PART-B

2	a	List the different fields of civil engineering and discuss in brief the scope of any two fields.	08
	b	Describe the idealization made in Engineering Mechanics and also the characteristics of a force.	08
3	a	Describe the engineering applications of cement.	08
	b	With a neat drawing, discuss the different components of a stair.	08
		OR	
4	a	What is Lintel? List different types of Lintels used in building construction.	08
	b	List and explain different types of construction chemicals used in field.	08
5	a	What are the sources of air pollution? Justify the remedial measures.	10
	b	Describe the basic outline for temperature and sound control systems in building.	06
		OR	
6	a	Explain the process of solid waste collection.	08
	b	Discuss the general plan followed for designing a smart building.	08

7	a	Discuss the requirements of permanent way.	10
	b	Explain the classification of tunnels.	06
		OR	
8	a	Discuss the classification of roads.	10
	b	List the details considered for Airport Site Selection.	06
9	a	What are transported soils and mention its classification.	08
	b	Discuss the functions and requirements of a good foundation.	08
		OR	
10	a	Discuss the classification of foundation.	08
	b	List the advantages and benefits of automation in construction.	08

QUESTION BANK
ELEMENTS OF CIVIL ENGINEERING
FOR REFERENCE ONLY

UNIT 1

1. Explain briefly the role of civil engineer in the infrastructural development of nation
2. Explain briefly the scope of civil engineering in
   i. Structural Engineering
   ii. Surveying
3. Discuss any two branches of civil engineering with applications.
4. State Principle of superposition of forces (Shall write diagram- 2 marks)
5. State Principle of transmissibility of forces (Shall write diagram-2 marks)
6. State Principle of Parallelogram of forces (Shall write diagram-2 marks)
7. Define couple and explain characteristics of couple.
8. Define moment of a force with diagram.
9. Explain various types of idealization assumed in mechanics.
10. Write equation of equilibrium for coplanar concurrent force system (2 Marks)
11. Write equation of equilibrium for coplanar Non concurrent force system(2 Marks)
12. State Varignons theorem (2 Marks)
13. Differentiate between resolution and composition of forces.
14. Explain various types of forces with a neat diagram and examples.
15. Study numerical on coplanar concurrent force system(Determining- Fx, Fy, R and α)
16. Study numerical on coplanar non concurrent force system (
    Determining- Fx, Fy, R, Total Moment , perpendicular distance d)

UNIT 2

17. List the various building materials used for construction. Explain briefly the engineering properties of bricks and cement.
18. Explain briefly reinforced cement concrete.
19. Explain briefly the various types of masonry used for construction.
20. Explain the engineering properties of structural steel.
21. Differentiate between Plain, Reinforced & Pre-stressed Concrete.
22. Outline various construction chemicals used in civil engineering industry.
23. Define plinth, chejja, and lintel. Mention their importance and materials used for construction.
24. Discuss the various types of masonry wall used in buildings.
25. Discuss the various types of slab, beam, column used in buildings.
26. Enumerate the objectives and requirements of staircase. List the different types of stair case and discuss any one type of staircase.
27. Discuss on building bye laws

UNIT 3

28. Analyze the importance of energy-efficient buildings for sustainable development. Evaluate the benefits and challenges of designing and constructing energy-efficient buildings.
29. Formulate a plan for designing a smart building based on given parameters such as location, building type, and occupant needs
30. Define air pollution. Explain briefly the sources of air pollution.
31. Explain the different types of disposal methods of municipal solid waste with advantages and disadvantages.
32. Briefly explain the need for protected water supply systems.
33. Explain the sources of municipal solid waste in India.
34. Explain briefly the collection methods of municipal solid waste.
35. Enumerate the factors affecting rate of demand.
36. Briefly explain the sources of water in terms of quality and quantity for a water supply scheme
37. Discuss the types of urban floods and suitable remedies.
38. With a flow chart, explain the various units of water treatment plant.
39. With a flow chart, explain the various units of waste water treatment plant.
40. Outline Temperature and Sound control system in buildings.

UNIT 4

41. Explain the classification of roads in India.
42. With a neat sketch , explain the components and functions of flexible pavements
43. With a neat sketch , explain the components and functions of rigid pavements
44. Draw a neat sketch of permanent way and mention the ideal requirements of permanent way.
45. Mention the functions and requirements of rails
46. Mention the functions and requirements of sleepers
47. Mention the functions and requirements of ballast
48. Explain briefly explain the classification of tunnels
49. Explain briefly explain the classification of harbour
50. Explain briefly explain the classification of Ports
51. Explain briefly explain the classification of airport as per AAI.
52. Explain briefly explain the classification of airport as per ICAO.
53. Discuss the relevance and need for integration of different transport system
54. List the factors to be considered for harbour and airport site selection.
55. Explain briefly the relevance and importance of multi modal transport system in Bengaluru city.

56. How does the implementation of a multi-modal transport system in Bengaluru contribute to the city's economic growth, social well-being, and environmental sustainability, thus making it a crucial component of the city's urban development plan?

UNIT 5

57. Define shallow foundation. Discuss any two types of shallow foundations.
58. State the objectives and requirements of foundations.
59. Define deep foundation. Discuss any two types of deep foundations.
60. Explain the process of weathering of rock and formation of soil.
61. List the factors to be considered in selection of foundation.
62. Classify the applications of robotics and automation in the construction industry and list the benefits of automation in construction
63. In the context of urban and rural development, how would you describe a smart city? What makes a city smart?
64. Outline the different sustainable goals provided by United Nations and its relevance to civil engineering.
65. Discuss the Concept of Sustainability in Civil Engineering.

SAMPLE MULTIPLE CHOICE QUESTIONS

1. Define gauge
2. The width of broad gauge adopted in India is
3. Define runway
4. Define Taxiway
5. List any four components of harbour
6. Which layer in pavement functions as drainage layer
7. List the materials used for construction of flexible pavement
8. Differentiate between harbour and port
9. Which type of tunnel is adopted for sewage transportation.
10. Which type of tunnel is adopted for pedestrian transportation.
11. Which type of soil is formed due to transportation by running water and deposited along streams
12. Which type of soil is formed due to formed by deposition in the seas.
13. Define weathering of rocks
14. Which type of foundation is recommended for mechanical industries
15. Which type of foundation is recommended When the column is close to the property line
16. Which type of foundation is recommended for construction of METRO PIERS?
17. Differentiate between shallow and deep foundations.

18. Define mortar and List the materials used for making mortar
19. The standard size of brick adopted in India is --------.
20. Distinguish between double wall and Single wall.
21. Define plinth and sill level.
22. Building tanks and dams and carrying stored water to field is known as
23. In the Proportioning of Plain Cement Concrete 1:2:4; 1 , 2 and 4 denotes ----------
24. Define Plinth area, carpet area, floor area ratio
25. List the objectives of waste water treatment plant
26. Define water demand.
27. Mention the variations of water demand.
28. Define fire demand.
29. Define garbage and rubbish
30. List the physical characteristic of municipal solid waste.
31. Differentiate between point and area sources of air pollution.
32. List the primary and secondary air pollutants.
33. Enumerate any two impact of air pollution on animals/plants/human beings.