Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER B.TECH DEGREE EXAMINATION (R), DECEMBER 2022

(2020 SCHEME)

Course Code: **20EST120**

Course Name: **Basics of Civil and Mechanical Engineering**

Max. Marks: **100** **Duration: 3 Hours**

PART I BASIC CIVIL ENGINEERING

Part I to be answered in pages 1 to 15

PART A

(Answer all questions. Each question carries 4 marks)

1. Explain the impact of Civil Engineering in the overall infrastructural development of a nation.
2. Explain the principles of surveying.
3. List and explain the constituent materials in cement concrete.
4. Differentiate between load bearing structure and framed structure.
5. Explain the energy systems and water management in green buildings.

PART B

(Answer one full question from each module, each question carries 10 marks)

MODULE I

6. a) Define CRZ. Explain the relevance of CRZ norms. (5)
   b) Explain the various factors to be considered for selection of site for a residential building. (5)

OR

7. a) List out classification of buildings as per NBC based on occupancy. Explain any two. (5)
   b) Illustrate various components of a residential building. Explain the functions of foundation, lintel and roof slab. (5)

MODULE II

8. a) Explain any three properties of a first class brick obtained from field test. How are they determined? (6)
   b) List out any four uses of a timber. (4)

OR

9. a) With help of neat sketches, explain any four market forms of steel sections used in construction. (4)
   b) Explain any three modern construction materials used for construction. (6)

MODULE III

10. a) Draw the elevation and plan of odd course and even course of one brick thick wall with English bond. (5)
    b) List out various types of flooring materials. Explain the application of any two. (5)

OR

11. a) Compare shallow and deep foundation with examples. With help of neat sketches explain combined footing and strap footing. (6)
    b) Discuss the civil engineering aspects of MEP and HVAC in commercial buildings. (4)

PART II BASIC MECHANICAL ENGINEERING

Part II to be answered in pages 16 to 30

PART C

(Answer all questions. Each question carries 4 marks)

12. State the zeroth law of thermodynamics.
13. With a neat block diagram, explain the air intake system of a Petrol engine.
14. Define (i) Refrigerating Effect (ii) One ton of refrigeration
15. What are the various types of extrusion processes?
16. List the various operations that can be performed on a lathe machine.

PART D

(Answer one full question from each module, each question carries 10 marks)

MODULE IV

17. Draw the PV diagram and derive the efficiency of a Carnot cycle. Mark the various process on the PV diagram. (10)

OR

18. a) With neat diagrams, explain the working of a 4 stroke Diesel engine (8)
    b) Give the full forms of (i) MPFI and (ii) CRDI (2)

MODULE V

19. a) With the help of neat sketch, explain vapor compression refrigeration system. (8)
    b) What are psychrometric charts? (2)

OR

20. a) With the help of a neat sketch explain the constructional details of a reciprocating pump (8)
    b) List the different types of gear trains (2)

MODULE VI

21. a) What are the desirable properties of a good moulding sand used in sand casting? (5)

b) How is 2 mill rolling different from 3 mill rolling? (Neat diagrams are mandatory) (5)

OR

22. Explain the basic working principle of a radial drilling machine with a neat sketch. (10)

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