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SAINTGITS COLLEGE OF ENGINEERING
KOTTAYAM, KERALA
(AN AUTONOMOUS COLLEGE AFFILIATED TO
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER B.TECH DEGREE EXAMINATION(R), FEBRUARY 2022
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 carries4 marks)

1. Explain the composition and properties of ordinary Portland cement
2. List any four types of buildings as per occupancy according to National Building Code.
3. Explain bearing capacity of soil.
4. Differentiate between PCC and RCC.
5. What is floor area ratio and explain its importance?

PART B

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

6. a) What are the factors to be considered while selecting the site for building?   (6)

    b) Distinguish between sub structure and super structure of a building.   (4)

OR

7. a) Illustrate the various components of a residential building with a neat sketch. Describe the functions of any three components.   (6)

    b) Explain the open space requirements of residential building as per NBC norms.   (4)

MODULE II

8. a) List out the properties of various types of steel used in building construction.   (5)

    b) Define ranging? Describe the procedure adopted in direct ranging.   (5)

OR

9. a) Explain any three types of cement used in construction.   (6)

    b) Describe the properties of a good brick used in building construction.   (4)

MODULE III

10. a) Explain the various energy saving options that can be adopted in green buildings.   (6)

    b) Differentiate English bond and Flemish bond with figures.   (4)

OR

11. a) How are foundations classified? Explain with figures any two types.   (7)

    b) Draw neat sketch of cantilever footing and continuous footing.   (3)

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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. How an SI engine differs from a CI engine.
13. Enumerate the advantages and limitations of CRDI system.
14. Define the terms: 1 TON of refrigeration, COP, Relative humidity, Overall efficiency of a turbine.
15. Discuss any one process of metal joining without melting the base materials.
16. Briefly explain the principle of Additive manufacturing process.

PART D
(Answer one full question from each module, each question carries 10 marks)
MODULE IV

17. a) With the help of neat sketch explain the working of a 2 stroke SI engine. (7)

    b) A Carnot engine receives 700 KJ of heat per cycle from a high temperature reservoir at 272^0C and rejects heat at a temperature of 54^0C. Find the theoretical efficiency of the cycle and the amount of heat rejected. (3)

OR

18. a) With P-V diagram, derive an expression for air standard efficiency of an Otto cycle. (7)
    b) Compare air cooling and water-cooling systems in an IC engine. (3)

MODULE V

19. a) With neat block diagram, explain the working of Vapour Compression Refrigeration System. (7)

    b) A turbine operates under a head of 25m. The power available at shaft is 2400 kW. Determine the discharge per second in litres, if the overall efficiency is 80%. (3)

OR

20. a) Illustrate the working principle of Simple gear train and Compound gear train. (7)

    b) How a centrifugal pump difference from a reciprocating pump. (3)

MODULE VI

21. a) With neat sketch explain the manufacturing process suitable for the production of uniform cross section products having finite length. (7)

    b) Briefly explain the principle of Arc welding process. (3)

OR

22. a) With the help of block diagram and marking the parts, explain the working of a Lathe. (7)

    b) Discuss any three Forging operations (3)

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