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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), MARCH-APRIL 2021

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. List any four major disciplines of Civil Engineering with brief explanation.
2. List any four general requirements regarding selection of plot for building construction.
3. What are the basic principles of surveying? (include sketch)
4. Write a note on use of elevators and escalators in building services.
5. What are the functions of foundation?

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

6. a) Explain the different components of a residential building and their functions with a neat sketch. (7)

   b) Define:
      i. Plinth area (3)
      ii. Floor area
      iii. Floor area ratio

OR

7. a) How buildings are classified based on occupancy? Explain specific features of any two classes of buildings. (7)

   b) Explain salient features of CRZ regulations. (3)

MODULE II

8. a) Explain the constituent materials of cement concrete with their functions. (5)

   b) List the uses of reinforcement steel and structural sections in construction. (5)

OR

9. a) Write a note on properties and uses of sand in construction. (5)

   b) What is the need of waterproofing? Write a note on waterproofing materials. (5)

MODULE III

10. Explain the specific functions of any five types of shallow foundations with neat sketches. (10)

OR

11. a) What are the requirements of an ideal roof? Briefly explain the classification of roofs. (5)

    b) Differentiate English bond and Flemish bond. Sketch the front elevations. (5)

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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. A Carnot cycle works between two temperature limits of 1000 ^{o}C and 30 ^{o}C. Calculate the air standard efficiency.

13. Write down the major four differences between a 2-stroke and 4-stroke engine

14. Which type of gears are used to connect non-parallel shafts with intersecting axes. Explain the geometry with simple sketch

15. Define i) dry bulb temperature, ii) wet bulb temperature, iii) dew point temperature, and iv) specific humidity

16. Compare soldering and brazing processes.

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

17. The minimum pressure and temperature in an air standard Otto cycle are 1 bar and 27 ^{o}C. The amount of heat added per cycle is 1500 kJ/kg. Find the pressure and temperatures at all points in the cycle. Represent the points on a p-v diagram. The compression ratio is 8. Take c_v = 0.718 kJ/kg-K and c_p = 1.005 kJ/kg-K for air. (10)

OR

18. With the help of necessary schematic diagrams, explain the working of a 4-stroke diesel engine. (10)

MODULE V

19. Using a block diagram, explain the working of a vapour compression refrigeration system (10)

OR

20. a) A Pelton turbine is designed to develop a shaft power of 12000 kW. The turbine is working under a head of 400 metres with a discharge of 3600 litres/s. Find the overall efficiency of the turbine (5)

   b) What are the different types of gear trains used? Describe any one in detail (using diagrams) (5)

MODULE VI

21. With necessary diagrams, explain any five hand forging operations (10)

OR

22. Using a block diagram, describe the details of milling machine. (10)

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