

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

**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**FIRST SEMESTER B.TECH DEGREE EXAMINATION (R,S), DECEMBER 2023****(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. List out any four duties and responsibilities of a Civil Engineer.
2. Explain the principles of surveying.
3. Classify sand based on the grain size of the particle. Explain the method used to obtain the grain size distribution of sand.
4. What is meant by green building? Write short note on the need for a comprehensive code for sustainable and green building practices.
5. With help of neat sketch, differentiate between load bearing and framed structure.

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

6. a) What is meant by CRZ? Explain the relevance of CRZ. (5)
- b) Explain 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 and material of construction. (5)
- b) With help of neat sketch explain functions of any six components of a residential building. (5)

**MODULE II**

8. a) Explain any three properties of a good 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 various types of steel sections used in construction (5)  
b) List and explain any five modern construction materials used for construction. (5)

**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) What is meant by bearing capacity of soil? List out any four functions of a foundation. (5)

**OR**

11. a) Compare shallow and deep foundation with examples. With help of neat sketches explain combined footing and strap footing. (6)  
b) Explain the Civil Engineering aspects of elevators and escalators (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. An engine operating on Carnot cycle between the temperatures limits  $20^{\circ}\text{C}$  and  $800^{\circ}\text{C}$  rejects heat at a rate of  $200\text{KJ/s}$ .  
Determine the (i) ideal thermal efficiency and (ii) Power output of engine.
13. Write the differences between two stroke and four stroke engines.
14. Define (i) Relative humidity and (ii) Dew point temperature
15. Compare impulse turbine and reaction turbines. Give examples for each turbine.
16. List the various operations that can be performed on a lathe

**PART D**

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

**MODULE IV**

17. a) What are air standard cycles? (2)  
b) With proper PV diagram, derive an expression to represent the efficiency of Carnot cycle (8)

**OR**

18. With the help of schematic diagrams explain the working of four stroke petrol engine (10)

**MODULE V**

19. a) Explain the working of a vapour compression refrigeration system with the help of schematic diagram. (8)  
b) Prepare neat diagrams (simple line diagrams) to distinguish between open belt (2)

and cross belt drive in power transmission. Mark the direction of rotation of each pulley.

**OR**

20. a) With neat diagrams explain the working principle of a centrifugal pump. (8)  
b) List at least 4 different types of gears (2)

**MODULE VI**

21. a) Explain the process of Arc welding with the help of a sketch (5)  
b) Differentiate two high and three high mill rolling process with diagrams. (5)

**OR**

22. a) Differentiate forward and backward extrusion process with the help of a sketches (6)  
b) Explain any two operations that can be performed on a drilling machine. (4)

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