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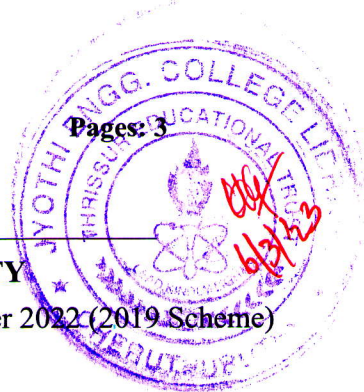
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester B.Tech Degree Regular and Supplementary Examination December 2022 (2019 Scheme)



Course Code: EST 120

**Course Name: BASICS OF CIVIL AND MECHANICAL ENGINEERING
(2019 -Scheme)**

PART 1: BASIC CIVIL ENGINEERING

Max. Marks: 50

Duration: 90 min.

PART A

Answer all questions, each carries 4 marks

Marks

- 1 Explain (a) Plinth area, (b) built-up area, (c) floor area, (d) floor area ratio (FAR) for a building as per Kerala Building Rules (KBR). (4)
- 2 What are the norms of Coastal Regulatory Zone (CRZ)? (4)
- 3 State the objectives of Surveying. (4)
- 4 Compare combined footing and isolated column footing based on nature of construction site. (4)
- 5 Explain the civil engineering aspects of escalators and ramps. (4)

PART B

Answer one full question from each module, each question carries 10 marks.

MODULE 1

- 6 a) What are the major disciplines of civil engineering? (4)
- b) Classify buildings based on National Building Code (NBC) of India. (6)

OR

- 7 Explain the functions of various components of a residential building. (10)

MODULE 2

- 8 a) List out any two examples for prefabricated building components stating any two advantages of using them in construction. (4)
- b) Classify bricks, and explain the characteristics of each type. (6)

OR

- 9 a) Differentiate plain cement concrete and reinforced cement concrete. (4)
- b) Explain the types of rolled steel sections and steel reinforcements. (6)

MODULE 3

- 10 a) Define the terms in the context of brick masonry - (a) frog, (b) perpend, (4)
(c) Quoin, and (d) bond
- b) Sketch the plan of odd and even courses and elevation of one brick thick English (6)
bond wall.

OR

- 11 a) Select a suitable floor covering material and roof covering material for a (4)
warehouse storing chemicals. State valid reasons for your selection.
- b) What is a green building? What are the main characteristics of a green building? (6)

PART 2 : BASIC MECHANICAL ENGINEERING

Max. Marks: 50

Duration: 90 min

PART A

Answer all questions, each carries 4 marks

Marks

- 12 Write notes on hybrid vehicles. (4)
- 13 What is meant by priming of a pump? Why is it necessary in a centrifugal pump? (4)
- 14 What are the different types of gears used in power transmission? (4)
- 15 Briefly describe rolling process. (4)
- 16 Explain the Additive manufacturing. (4)

PART B

Answer one full question from each module, each question carries 10 marks.

MODULE 4

- 17 In an air standard diesel cycle, the compression ratio is 16 and at the beginning of (10)
compression the temperature is 15°C and the pressure is 0.1 MPa. Heat is added
until the temperature at the end of the constant pressure process is 1480°C.

Calculate

- (i) cut-off ratio
- (ii) Heat supplied per kg. of air
- (iii) Work done per kg. of air
- (iv) Efficiency of the cycle.

Take Assume $C_p = 1.005 \text{ kJ/kg. K}$ and $C_v = 0.718 \text{ kJ/kg. K}$.

OR

- 18 a) Explain the working of four stroke petrol engine with neat sketches. (8)
- b) How does a two stroke engine differ from four stroke engine? (2)

MODULE 5

- 19 With the help of flow and p - h diagram explain the working of a vapour compression refrigeration system. (10)

OR

- 20 Explain with a neat sketch, the working of Kaplan turbine. (10)

MODULE 6

- 21 Explain the production processes:- (10)

- (i) Turning
- (ii) Arc welding
- (iii) Extrusion
- (iv) Forging

OR

- 22 Explain the elements of CNC systems with block diagram. List the advantages of CNC machines. (10)
