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 **Presidency University**

**Bengaluru**

 **SCHOOL OF ENGINEERING**

 **MAKE UP EXAMINATION SEP 2023**

**Course Code** : MEC 101

**Course Name:** Elements of Mechanical Engineering

**Program & Sem**: B.Tech

**Date**:05.10.2023

**Time**: 1.00 PM to 4.00 PM

**Max Marks**: 100

**Weightage**: 50%

 **Instructions:**

1. ***Read the question carefully and answer all the questions***

**Part A [Memory Recall Questions]**

**Answer all the Questions. (10Qx2M=20M)**

1. List any four Renewable Sources of Energy. (C.O.1) [Knowledge]

2. State the second law of thermodynamics. (C.O.1) [Knowledge]

3. **What is compression ratio in IC engine?**  (C.O.2) [Knowledge]

4. **How will you classify the turbines based on the working fluid used?** (C.O.2) [Knowledge]

5. What are all the factors to be taken into account for selecting transmission system?

 (C.O.3) [Knowledge]

6. Mention few advantages of belt drive in mechanical power transmission. (C.O.3) [Knowledge]

7. What are Ferrous Metals & give examples (C.O.4) [Knowledge]

8. What are Non-Ferrous Metals & give examples (C.O.4) [Knowledge]

9. What do you mean by Manufacturing? (C.O.5) [Knowledge]

10. What do you mean by Machining? (C.O.5) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer all the Questions. (5Qx8M=40M)**

11. I want to do thermodynamic analysis on IC engine, please suggest which type of thermodynamic system should I consider and why? Give definition for system, surrounding and boundary also. Also explain open, closed and isolated system with examples. (C.O.1) [Comprehension]

12. The IC engines used in motor cycle and the one used heavy trucks are different in the way of igniting the charge. Likewise list at least eight differences between them. (C.O.2) [Comprehension]

13. Gear drive is one of the very popular mode of power transmissions especially when exact speed ratio need to be maintained. List the various types of gears that you know and explain each one of them briefly. (C.O.3) [Comprehension]

14. For the given material, What are the Mechanical Properties you consider explain each one of them briefly. (C.O.4) [Comprehension]

15. If you want to produce a taper surface on a cylindrical workpiece, how do you achieve by Swivelling the Compound Rest Method? (C.O.5) [Comprehension]

**Part C [Problem Solving Questions]**

**Answer all the Questions. (5Qx8M=40M)**

16. (i) At what temperature C and F become equal? Prove.

 (ii) Assume, 3000 J of heat is added to a system and 2500 J of work is done by the system. What is the change in internal energy of the system? (C.O.1) [Application]

17. A 4-stroke engine has a piston diameter 250mm and stroke 400mm. The mean effective pressure is 4 bar and speed is 500 rpm. The diameter of the brake drum is 1000mm and the effective brake load is 400N. Find the indicated power, brake power, friction power and mechanical efficiency. (C.O.2) [Application]

18. (i) Tension in tight and slack side of a belt on driving pulley are 500 N and 300 N respectively. The diameter of the driving pulley is 200 mm and rotates at 500 rpm. Calculate the power transmitted by the driving pulley to driven pulley.

 (ii) Calculate the power transmitted by driving gear to driven gear, when it transmits 100 N-m of torque to driven gear. Speed of the driving gear is 150 rpm. (C.O.3) [Application]

19. What are the important & popular applications of Materials?, explain in detail. (C.O.4) [Application]

20. With the help of a sketch explain the working of Horizontal Column & Knee type milling machine. (C.O.5) [Application]