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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12ME215** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **THERMAL ENGINEERING II** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | If the temperature of intake air in internal combustion engine increases, then its efficiency will \_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 2. | The inside diameter of the cylinder is called\_\_\_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 3. | The air fuel ratio in petrol engines is controlled by \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 4. | The ignition quality of petrol is expressed by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | (1) |
| 5. | Define Mach number | (1) |
| 6. | A convergent nozzle is said to be choked when the critical pressure is attained at the \_\_\_\_\_\_\_\_\_\_. | (1) |
| 7. | The maximum temperature in a gas turbine is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 8. | The efficiency of a jet engine is higher at \_\_\_\_\_\_\_\_\_\_\_. | (1) |
| 9. | An opening through which air is supplied to the treated space is called\_\_\_\_\_\_\_. | (1) |
| 10. | In a refrigeration system, the expansion device is connected between the\_\_\_\_\_\_\_\_. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Classify Internal Combustion engines. | (3) |
| 12 | Plot the P-V and T-S diagram of Dual cycle. | (3) |
| 13 | Define the term Fanno flow. | (3) |
| 14 | List the limitations of gas turbines. | (3) |
| 15 | Define ton of refrigeration. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | List the differences between two stroke and four stroke IC engines. | (10) |
| b. | Draw the port timing diagram for 2 stroke engines. | (5) |
| (OR) | | | |
| 17. | a. | Discuss briefly wet sump lubrication system with neat sketch. | (15) |
| 18. | a. | An engine of 250mm bore and 375mm stroke works on Otto cycle. The clearance volume is 0.00263m3. The initial pressure and temperature are 1 bar and 50°C. If the maximum pressure is limited to 25bar, find the following: (a) The air standard efficiency of the cycle (b) The mean effective pressure for the cycle. Assume the ideal conditions. | (15) |
| (OR) | | | |
| 19. | a. | Derive an expression for the mean effective pressure of an Otto cycle with the help of P-V diagram. | (15) |
| 20. | a. | A conical air diffuser has an inlet diameter of 40cm and exit diameter of 80cm. Air enters the diffuser with a static pressure of 200KPa, static temperature of 37oC.The average velocity of flow at the inlet of the diffuser is 265m/s. Calculate a) mass flow rate b) the properties at the exit section and c) force exerted on the diffuser walls. | (15) |
| (OR) | | | |
| 21. |  | Explain: |  |
| a. | Subsonic flow | (5) |
| b. | Transonic flow | (5) |
| c. | Supersonic flow with suitable sketches | (5) |
| 22. | a. | In an air – standard regenerative gas turbine cycle the pressure ratio is 5.Air enters the compressor at 1 bar, 300K and leaves at 490k.The maximum temperature in the cycle is 1000K.Calculate the cycle efficiency, given that the efficiency of the regenerator and the adiabatic efficiency of then turbine are each 80%. Assume for air, the ratio of specific heats is 1.4. | (15) |
| (OR) | | | |
| 23. | a. | Explain with a neat sketch explain the principle of operation of a turbojet engine and state its advantages and disadvantages. | (15) |
| 24. | a. | Explain any three types of air conditioning components with neat sketch. | (15) |
| (OR) | | | |
| 25. | a. | Explain different types of air distribution systems with neat sketch. | (15) |

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