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## Seat No.

### F.E. (Semester – II) Examination, 2014 BASIC MECHANICAL ENGINEERING (Old) (2008 Course)

Time : 3 Hours

Max. Marks : 100

Note: 1) Solve Q. 1 or Q. 2, Q. 3 or Q. 4 and Q. 5 or Q. 6 from Section I. 2) Solve Q. 7 or Q. 8, Q. 9 or Q. 10 and Q. 11 or Q. 12 from Section II.

*3)* Assume suitable data **if required**.

#### SECTION - I

| 1. | A) | Define 2 <sup>nd</sup> law of thermodynamics. Explain any two applications of 2 <sup>nd</sup> law of thermodynamics in brief.                                 | (2+3+3)              |
|----|----|---|----------------------|
|    | B) | Define ideal gas. List the laws followed by ideal gas and write ideal gas equation with units of each parameter.  | ו<br>( <b>2+3+3)</b> |
|    |    | OR  |                      |
| 2. | A) | Sketch Carnot cycle on P-V and T-s Diagram, Indicate and explain the processes occurring.   | (4+4)                |
|    | B) | What is heat engine ? Explain its efficiency.   | (4+4)                |
|    |    | A heat engine receives heat at the rate of 1500 kJ/min and gives an output of 8.2 kW Determine : (i) The thermal efficiency; (ii) The rate of heat rejection. | Ι.                   |
| 3. | A) | Draw a neat sketch of any boiler, explain its working and list the components.  | (4+4)                |
|    | B) | Explain the working of window room air conditioner with VCC cycle.  | (4+4)                |
|    |    | OR  |                      |
| 4. | A) | Differentiate between four stroke Petrol and Diesel engines (4 points).   | (2×4)                |
|    | B) | Draw only sketch of<br>i) Working principle of impulse and reaction turbine<br>ii) Reciprocating compressor.  | (4+4)                |
| 5. | A) | Explain Nuclear Power plant with neat sketch.   | (4+4)                |
|    | B) | Draw sketch and derive the expression for heat transfer in a two layer hollow composicylinder.  | site<br>(2+6)        |
|    | C) | Write four examples of insulating materials.<br>OR  | 2                    |

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| 6.  | A) | Explain the working of Hydroelectric power plant with neat sketch. (4+4  | )  |
|-----|----|--|----|
|     | B) | The inner surface of a plane brick wall is at $60^{\circ}$ C and the outer surface is at $35^{\circ}$ C. If the rate of heat transfer is 58 W/m <sup>2</sup> for the wall, which is 220 mm thick. Calculate thermal conductivity of the brick in W/m°C. If the temperature of the inner surface is increased to $100^{\circ}$ C what will be the rate of heat transfer ? (4+4) | •) |
|     | C) | State Stefan Boltzman's Law.   | 2  |
|     |    | SECTION – II   |    |
| 7.  | A) | Explain any two types of bearing with the neat sketches. (4+4  | )  |
|     | B) | Explain the open belt drive and crossed belt drive with neat sketch. (4+4<br>OR  | )  |
| 8.  | A) | Draw sketch and state uses of : flexible coupling and Oldham's coupling. (4+4  | .) |
|     | B) | List different types of breaks and explain any one of with neat sketch. Also write its applications. (2+4+2)   | 2) |
| 9.  | A) | Write a short note on ergonomic considerations in design.  | 8  |
|     | B) | State applications and properties of : Brass, Steel. (4+4<br>OR  | )  |
| 10. | A) | Describe casting process.  | 8  |
|     | B) | Explain with neat sketch spot welding and write its applications. (6+2   | 2) |
| 11. | A) | Explain any four operations performed on drilling machine with neat sketch. (4×2   | ?) |
|     | B) | Explain the advantages and disadvantages of NC and CNC machine. (4+4   | )  |
|     | C) | Draw sketch of saw milling.  | 2  |
| 12. | A) | Draw the neat label diagram of Centre lathe machine and explain the parts of it. (4+4  | )  |
|     | B) | Explain: Face milling and End milling operation with sketch. (4+4  | .) |
|     | C) | State the name of mechanism used for feeding drill head, in drilling machine.  | 2  |

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