G 1282 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

First and Second Semester

EN 010 107—BASIC MECHANICAL ENGINEERING

(Common for all Branches)

{New Scheme—2010 Admission onwards}

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Draw the P-V diagram of an Otto cycle.
2. Under what situation two-stroke cycle engine is preferred to four stroke cycle engine ? Explain the reason.
3. Define velocity ratio and stip with respect to belt drive.
4. What is specific speed of a turbine ? Explain its significance.
5. What are the merits of gas welding over arc welding.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain system, surroundings, boundary with respect to thermodynamics.
7. Distinguish between diesel and petrol engines.
8. With neat sketches, describe the power transmission through chains.
9. Discuss any *two* non-conventional energy sources.
10. Describe the working of a milling machine. What are its applications ?

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Drive the adiabatic equation $PV^{\gamma} = C$ and prove that the adiabatic index $\gamma = \frac{C_p}{C_v}$.

(12 marks)

Or

Turn over

12. 2.5 kg. of an ideal gas is expanded from a pressure of 7 bar and volume 1.5 m^3. to a pressure of 1.4 bar and volume 4.5 m^3. The decrease in internal energy is 500 kJ. The specific heat at constant volume for the gas is 0.72 kJ/kg. K. Determine (i) Gas constant ; (ii) Index of polytropic compression ; (iii) Work done during polytropic compression ; and (iv) initial and final temperature. (12 marks)

13. With neat sketches, discuss the working of a vapour absorption refrigeration system. (12 marks)

Or

14. (a) Describe the types of lubricating systems in engines along with their properties. (6 marks)

(b) With a neat diagram, describe the functioning of a carburetor ? (6 marks)

15. Derive the expression for the ratio of tension in a belt drive. (12 marks)

Or

16. Determine the number of teeth and speed of the driver if the driven gear has 60 teeth of 8 mm. module and rotates at 240 r.p.m. The two spur gears have a velocity ratio of $\frac{1}{4}$. Also calculate the pitch line velocities. (12 marks)

17. Draw neat sketch of a nuclear power plant. Label the important parts and explain their functions. (12 marks)

Or

18. Define specific speed of a hydraulic turbine. How the turbines can be classified according to the specific speed ? Compare the hydraulic turbines with steam turbines. (12 marks)

19. (a) Describe the principle of CNC machines ? (6 marks)

(b) Explain any *one* CAD/CAM used in modem design ? (6 marks)

Or

20. Explain the process of manufacturing steel sections by rolling process, starting from pig iron. (12 marks)

[5 × 12 = 60 marks]