Roll No. **Enrolment No.**

C.U.SHAH COLLEGE OF ENGINEERING & TECHNOLOGY, WADHWAN
B.E. all semester-II Mid semester Examination March-2009
Date: 26/3/09 **Time: 3:00pm to 4:30pm** **Max. Marks:40**
Subject: Element of Mechanical Engineering

Instruction: 1) Attempt all questions.
2) Make suitable assumption wherever necessary.
3) Figure to the right indicates full marks.

Q-1. (A) (1) What is prime-mover? Give classification of prime-movers. **(03)**
(2) Derive characteristics equation of a perfect gas. **(02)**

Q-1 (B) Attempt any two. **(10)**

(1) For adiabatic process, prove that $PV^{\gamma} = C$.
(2) Explain Isothermal process for a perfect gas with neat sketch.
(3) Give only different statements of second law of thermodynamics with neat Sketch.

Q-2. (A) Explain four stroke petrol engine with neat sketch. **(05)**

Q-2 (B) Attempt any two. **(10)**

(1) What is governor? Explain Watt-governor.
(2) What is pump? Classify pump & its application.
(3) Comparison between two-stroke engine & four-stroke engine.

Q-3. Attempt any two. **(10)**

(1) A quantity of gas occupying 0.2 m^3 at 9.2 bar receives heat at constant pressure until the volume increases to 0.4m^3. The initial temperature is 300˚C &
Cp = 0.992 KJ/Kg K
Cv = 0.71 KJ/Kg K.
Find, (1) Change in internal energy.
(2) Work-done.
(3) Change in enthalpy.

[P.T.O.]

(2) During testing of single cylinder two stroke diesel engine following data were obtain

Engine torqe = 650 N m
Speed = 400 rpm
Bore = 20 cm
Stroke length = 30 cm
Oil consumption = 8.5 Kg/hr
Mean effective pre.= 5.5 bar
Calorific value = 42500 Kj/kg

Calculate,

(1)Indicator power
(2)brake power
(3)mechanical efficiency
(4)indicator thermal eff.
(5)brake thermal eff.
(6)specific fuel consumption

(3) Define following terms

(1) Specific heat
(2) Dry saturated steam
(3) Dryness fraction
(4) Swept volume
(5) Clearance volume