Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**

P2HTCC07

2nd Semester Regular Examination 2016-17

Internal combustion engine

BRANCH: HEAT POWER & THERMAL ENGG, HEAT POWER ENGG, THERMAL ENGG

Time: 3 Hours

Max Marks: 100

Q.CODE: Z826

Answer Question No.1 which is compulsory and any FOUR from the rest.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: ***Short answer type*** **(2 x 10)**

- **a)** What is detonation? And what are its ill-effects?
- **b)** How SI engine fuels are rated?
- **c)** Which engine is suitable for super-charging-SI or CI engine? Why?
- **d)** On basis of same compression ratio and heat rejection, compare otto, diesel and dual cycle?
- **e)** What is blow by and blow down process?
- **f)** What is use of combustion chart?
- **g)** What are the difference between battery ignition system and magneto ignition system?
- **h)** Explain the various factors that influence the flame speed?
- **i)** What are the important methods of charge stratification?
- **j)** Sketch the heat balance curve for SI engine?

Q2 **a)** Show by suitable graph the effect of dissociation on maximum temperature and brake power. Explain the effect of the presence of CO in dissociation. **(10)**

b) A petrol engine of compression ratio 6 uses a fuel of calorific value 43500 KJ/Kg. The air –fuel ratio is 15:1. The temperature and pressure of the charge at the end of the suction stroke 60^0C and 1 bar, respectively. Determine the maximum pressure in the cylinder if the index of compression is 1.32 and the specific heat at constant volume is expressed by the relation, $C_v = 0.71 + 2x10^{-4}T$ kj/kg-k. **(10)**

Q3 **a)** Explain the different stages of combustion in SI engine. **(10)**

b) An eight cylinder four stroke engine of 9 cm bore and 8 cm stroke with a compression ratio of 7 is tested at 4500 rpm on a dynamometer which has 54cm arm. During a 10 minutes test the dynamometer scale beam reading was 42kg and the engine consumed 4.4kg of gasoline having a calorific value of 44000 kJ/kg. Air 27^0C and 1 bar was supplied to the carburettor at the rate of 6 kg/min. Find (i) the brake power delivered (ii)the brake mean effective pressure (iii)the brake specific fuel consumption (iv) the brake specific air consumption (v) the brake thermal efficiency (vi)the volumetric efficiency and (viii) the fuel – air ratio. **(10)**

Q4	**a)**	what is supercharging? Explain the types of the supercharging are and Effects of super charging?	**(10)**
	b)	A simple jet carburetor is required to supply 5 kg of air and 0.5 kg of fuel per minute. The specific fuel gravity is 0.75.the air is initially at 1 bar and 300k. Calculate the throat diameter of the choke for a flow velocity of 100 m/s. Velocity coefficient is 0.8. If the pressure drop across the fuel metering orifice is 0.80 of that of the choke, calculate orifice diameter assuming, C_{df}= 0.60 and Υ = 1.4 .	**(10)**
Q5	**a)**	What are the different types of cooling system used in IC engine?	**(10)**
	b)	Discuss various method of control for emission from petrol engine.	**(10)**
Q6	**a)**	What are the various method of turbo-charging? Compare their relative merits and demerits.	**(10)**
	b)	Explain the different types of combustion chamber in SI engine.	**(10)**
Q7	**a)**	What is a variable compression engine? Explain the method of obtaining variable compression ratio.	**(10)**
	b)	i- Discuss fault diagnosis of S.I engine. ii- Explain Wankel rotary combustion engine.	**(10)**