Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:2161902 Date:14-12-2022

Subject Name:Internal Combustion Engines

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are alloweds.**

			MARKS
Q.1	**(a)**	Define the following terms i. Heat engine ii. Compression ratio iii. Brake thermal efficiency	**03**
	(b)	Compare the spark ignition engine with compression ignition engine.	**04**
	(c)	Explain in detail the phenomenon of dissociation.	**07**
Q.2	**(a)**	Define the following terms i. Octane Number ii. Cetane Number iii. Highest Useful Compression Ratio(HUCR)	**03**
	(b)	Describe in brief the splash lubrication system	**04**
	(c)	Explain with the neat sketch the construction and working of Junker's gas calorimeter.	**07**
		OR	
	(c)	Explain the following terms i. Enthalpy formation ii. Enthalpy of reaction iii Adiabatic flame temperature.	**07**
Q.3	**(a)**	State the methods and devices for emission control from S I Engines.	**03**
	(b)	Explain requirement of air fuel ratio for maximum power and maximum efficiency.	**04**
	(c)	A simple jet carburetor is required to supply 5 Kg of air per minute and 0.5 Kg of fuel per minute having density 740 Kg/m^3. The air initially at 1.05 bar pressure & 27ºC temperature. Calculate the throat diameter of the choke for a flow velocity of 90 m/s. The velocity co-efficient is 0.8. Take C_v=0.7 kJ/kg.K and R= 0.287 kJ/kgK	**07**
		OR	
Q.3	**(a)**	State the functions of IC engine lubrication system.	**03**
	(b)	Justify the necessity of I C engine cooling.	**04**
	(c)	Explain the construction and working of bosch fuel injection pump used for Diesel engines.	**07**

Q.4 **(a)** State the effects of supercharging on following parameters of C I engines. **03**

i. Brake power
ii. Mechanical Efficiency
iii. Knock tendency

(b) Discuss the advantages and disadvantages of super charging. **04**

(c) Explain with neat sketch Hit and Miss governing **07**

OR

Q.4 **(a)** State the objectives of supercharging. **03**

(b) Compare the supercharging with turbocharging, **04**

(c) Explain with neat sketch working of coil ignition system. **07**

Q.5 **(a)** Enlist the factors to be considered while selecting the site for a Diesel Engine power plant. **03**

(b) A petrol engine working on Otto cycle has a compression ratio 8. The specific heat at constant volume increases by 2 %. Calculate the change in air standard efficiency of the cycle. Take C_v=0.7 kJ/kg.K and R= 0.287 kJ/kgK as an average value. **04**

(c) Descrbe with sketch the different stages of combustion in C I engine. **07**

OR

Q.5 **(a)** " S I engine are quantity governed and C I engine are quality governed engines" Comment on this statement. **03**

(b) Describe in beif the " Morse test". also state its limitations. **04**

(c) The following data were recorded while conducting a Morse test on 4-cylinder, 4- stroke petrol engine at particular Costant speed **07**

Brake power with all cylinder working---- 21 kW
Brake power with no.1 cylinder cut off ---- 14.8 kW
Brake power with no.2 cylinder cut off ---- 14.5 kW
Brake power with no.3 cylinder cut off ---- 14.6 kW
Brake power with no.4 cylinder cut off ---- 14.75 kW

Estimate the indicated power of the engine and its mechanical efficiency.

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