Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Remedial Examination April 2010

Subject code: 711102

Subject Name: Fundamentals of I.C. Engine and Automobile

Date: 07 / 04 / 2010 **Time: 12.00 noon – 02.30 pm**

Total Marks: 60

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks**

Q.1 **(a)** Discuss in detail the effects of following on fuel air Otto cycle. **06**

i) Burning time losses
ii) Heat losses
III) Exhaust blow down losses
iv) Rubbing friction losses

(b) Explain with neat sketch valve timing diagram of 4 stroke CI engine. **06**

Q.2 **(a)** Why M.P.F.I. systems are used in modern automobiles having S.I. engines? Explain its working and state its advantages. **06**

(b) Explain the effects of dissociation on maximum temperature and power with suitable graphs. **06**

OR

(b) With the help of a neat sketch explain the working of electronic ignition system used for automotive engines. **06**

Q.3 **(a)** With the help of suitable sketches, describe the working principle of following systems of a modern carburetor : **06**

i) main metering system.
ii) idling system.
iii) power enrichment system.
iv) acceleration pumps system.

(b) Explain with neat sketch working of valve mechanism for overhead camshaft (OHC) engine. **06**

OR

Q.3 Design a connecting rod for an IC engine running at 1800 rpm and developing a maximum pressure of 3.15 N/mm^2. The diameter of the piston is 100 mm, mass of the reciprocating parts per cylinder 2.25 kg, length of connecting rod 380 mm, stroke of piston 190 mm and compression ratio 6: 1. Take a factor of safety 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing pressures as 10 N/mm^2 and 15 N/mm^2. The density of material of the rod may be taken as 8000 kg/m^3 and the allowable stress in the bolts as 60 N/mm^2 and in cap as 80 N/mm^2. The rod is to be of I – section for which you can choose your own proportations. **12**

Draw a neat dimensional sketch showing provision for lubrication. Use Rankine formula for which the numerator constant may be taken as 320 N/mm^2 and denominator constant 1/7500.

Q.4 **(a)** Write a short note on stratified charge engines. **06**

(b) Discuss important designs of variable compression ratio engines with the help of neat sketches. **06**

OR

Q.4	**(a)**	Discuss different methods to insulate engine components for effective reduction of heat transfer from the engine and performance of low heat rejection engine.	**06**
	(b)	Write a short note on camless engines.	**06**
Q.5	**(a)**	Sketch the layout, explain the construction and working of synchromesh gearbox used on any Indian vehicle. Explain the common faults encountered in gearboxes.	**06**
	(b)	Discuss various troubles generally encountered with wheels and tyres. What are their symptoms and probable causes? Suggest possible remedies also.	**06**

OR

Q.5	**(a)**	Explain the principle of power steering system and describe a linkage type booster type power steering system with the help of suitable diagram.	**06**
	(b)	Sketch the construction of a double acting telescopic type hydraulic shock absorber and explain its working. Why is it known as " double acting " and "telescopic type"?	**06**

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