MECHANICAL ENGINEERING DEPARTMENT

MEL713 DESIGN OF I.C. ENGINES: COMPONENTS & SUBSYSTEMS

MAJOR **29-11-2006**

TOTAL TIME: 2 HOURS **MAXIMUM MARKS FOR PART A: 15**

THIS IS PART A

RETURN PART A AND THEN TAKE PART B

PLEASE BE VERY BRIEF AND TO THE POINT!

USE OF BOOK S AND NOTES NOT ALLOWED IN PART A

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1. How would ignition delay in a diesel engine be affected by engine speed? Show a graph.

2. For an existing 4 stroke, 4 cylinder car engine using a conventional spark ignition system, an alternative ignition system has to be designed and installed. Which one would you choose and why?

3. The engine in problem 2 which has a carburetor has to be fitted with a fuel injection system. Which type (Manifold, Port or Direct Cylinder) injection would you recommend and why?

4. What is the importance of injection timing in a diesel engine from the point of view of NO emissions?

5. What is the important consideration for a spark ignition engine fuel from the point of view of evaporative emissions?

1 mark each

6. An engine with inlet valve closing 40° abdc is run at rated speed of 4500 rev/min and wide open throttle. The volumetric efficiency of the engine at this condition is 0.9. The engine is now run at 5500 rev/min and wide open throttle. Will the volumetric efficiency be same, lower or higher and why?

7. What are the major pollutants from a diesel engine? What control devices can be used to keep them in check?

8. A spark ignition engine which has a flat cylinder head is to be re-fitted with a wedge-shaped head. Where will you locate the spark plug? Show in a sketch. Will the combustion be faster or slower? What effect will it have on NO emissions?

9. You go to your car mechanic and find that the engine is producing a lot of CO emissions. What do you think he should do to reduce the CO emissions so that you can get a proper PUC certificate (No, you cannot bribe the police!)

10. A car engine (SI) will not start in the morning during peak winter. The problem is not with the battery but with the engine. What could the possible reasons be and how would you try and solve them? **Be brief!**

2 marks each