Name :	
Roll No. :	A dama of Kanada and Kaland
Invigilator's Signature :	

CS/B.TECH(AUE)/SEM-5/AUE-502/2011-12 2011

AUTOMOTIVE DIESEL ENGINES

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

 $10 \times 1 = 10$

i) Cetane no. of \propto -methyl naphthalane is

- a) 0 b) 100
- c) 85 d) 15.

ii) If aniline point of 'x' fuel is more than 'y' fuel, cetane no.of 'y' fuel is

- a) higher b) lower
- c) some d) impossible to say.

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iii) TEL increases

a)



- Octane no. b) Cetane no.
- c) Cloud point d) None of these.

iv) For diesel engines, the method of governing employed is

- a) quantity governing
- b) quality governing
- c) hit and miss governing
- d) both (a) and (b).
- v) If the compression ratio in petrol engine is nearly equal to diesel engine
 - a) ignition of fuel will be delayed
 - b) pre ignition of fuel will take place
 - c) combustion does not occur
 - d) none of these.

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- vi) Long delay period in CI engine decreses knocking. This statement is
 - a) True
 - b) False
 - c) Delay period does not affect knocking
 - d) None of these.
- vii) If the temperature of supply air to an IC engine increase, its efficiency
 - a) increases
 - b) decreases
 - c) does not change
 - d) may increase or decrease depending on other factors.
- viii) The power to weight ratio of diesel engine compared to petrol engine is
 - a) same b) less
 - c) more d) variable.

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c) 4 d) 22.3.

GROUP – **B**

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. What are the assumptions made in an air standard cycle ?
- 3. Prove that efficiency of Carnot cycle is higher that Otto cycle.
- 4. Compare knocking between CI and SI engines with various variables.
- 5. Sketch the diesel cycle on P_V and T_S diagrams and show in relevant diagrams the heat input and work done in various processes.
- 6. What are API gravity and Diesel Index ?
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- 7. a) Derive an expression for air standard efficiency of the Disel cycle.7
 - b) The compression ratio of a diesel engine is 10 and the Pr. and Temp of the beginning of compression is 1 bar and 40°C. The amount of heat added is 2700 KJ in the cycle. If Max pressure is limited to 25 bar, calculate mean effective pressure and thermal efficiency.
- 8. a) Explain the stages of combustion in a CI engine with $p-\theta$ diagram and show different important points in the diagram. 8
 - b) What is ignition delay ? Explain briefly about the different features affecting the delay period.7
- 9. a) If Iso-octane is burned with 20% less air than requirement, calculate

- i) A/F ratio
- ii) Equivalence ratio. 6
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- b) Define
 - i) Flash point
 - ii) Fire point
 - iii) Cloud point
 - iv) Aniline point.
- c) Discuss the effect of Cetane number on diesel knock. 3
- 10. a) During the trial of a single cylinder, four stroke diesel engine, the following results were obtained :

Cylinder dia = 22 cm, stroke = 40 cm, *imep* = 6 bar, torque = 387 Nm, N = 280 rpm, oil consumption = 4 kg/h, *CV fuel* is 43000 kg/kg, cooling water flow rate = 4.5 kg/min, air used per kg of fuel = 28 kg, rise in cooling water temperature = 45° C, temperature of exhaust gases = 460° C, room temperature = 20° C, mean specific heat of exhaust gas = 1 kJ/kg-K, specific heat of water = 4.18 kJ/kg-K.

Find IP, BP, indicated and brake thermal efficiency, volumetric efficiency and draw up a heat balance sheet for the test. 10

b) What are the requirements of a diesel injection system ? 5

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c) What are the limitations of a turbocharger ?

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