Menoufiya University
Faculty of Engineering Shebin El-Kom
Mechanical Power Engineering Department
Second Semester Examination 2014-2015

Minufiya University

Subject: Air Pollution
Code: MPE 628
Level: Master
Time Allowed: 3 hours
Total Marks: 100 marks
Date of Exam:15/6/2015

Answer the following questions:

Question 1 (25 Marks)

Choose the most appropriate answer:

1.1 Smoke in CI engines is noticed during: (5 Marks)

a) Starting and idling b) Light loads
c) Heavy loads d) Acceleration

1.2 NO_x emission in SI engines will be lowest during: (5 Marks)

a) Idling b) Accelerating c) Decelerating d) Partial Load

1.3 Lead compounds are added in gasoline to: (5 Marks)

a) Reduce HC emissions b) Reduce Knocking
c) Reduce Exhaust temperature d) Increase power output

1.4 Barium compounds are added in CI engines fuels to: (5 Marks)

a) Reduce HC emissions b) Reduce soot
c) Reduce smoke d) b& C

1.5 The main gases that participating in the green house phenomena are:

a) NO_x, CO_2, SO_2 and CO b) CH_4, CO, CFC and CO_2 (5 Marks)
c) CO_2, NO_2, C H_4 and CFC d) O_3, SO_2, CFC and C H_4

Question 2 (25 Marks)

2.1 Report the factors affecting emission from spark ignition engine. (5 Marks)

2.2 Suggest alternative fuels can be considered good for petrol engines from exhaust emission? (5 Marks)

2.3 Explain with equations the cause of formation of NO in petrol engine exhaust. (5 Marks)

2.4 A spark ignition engine driving a car uses on average 100 grams of gasoline per mile traveled. The average emissions from the engine are 2.0, 3.0 and 20 grams per mile NO_2, HC, and CO, respectively. The engine operates with a stoichiometric gasoline air mixture. Find the average concentrations in parts per million of NO_2, HC, and CO in engine exhaust. (10 Marks)

Question 3 (25 Marks)

3.1 Discuss the suitability of the following fuels in diesel engines

a) Methanol gas b) Natural gas (8 Marks)

3.2 What are the sources of evaporative emission in diesel engines? How it can be controlled? (8 Marks)

3.3 Explain the factors that affect emission concentration from diesel engines. (9 Marks)

Question 4 (25 Marks)

4.1 Discuss the air pollution from gas turbines and compare it with emissions from conventional piston engines. (5 Marks)

4.2 Describe the mechanism of smoke formation. How smoke intensity can be measured? (7 Marks)

4.3 Petrol having an analysis 85% C and 15% H_2 by mass is burned with 17 times its mass of air. Determine the mass of each gas in the exhaust. (13 Marks)

With our best wishes

This exam contributes " by measuring in achieving Programme Academic Standards according to NARS															
Question Number	Q1.1	Q1.2	Q1.3	Q1.4	Q1.5	Q2-4	Q3.1	Q4.3			Q2.1	Q2.2	Q2.3		
Skills	KU!	KU1	KU4	KU4	KU4	I1	I2	I7			Pp2	Pp3			
	Knowledge & Understanding Skills					Intellectual Skills					Professional Skills				