

Menoufiya University
Faculty of Engineering Shebin El-Kom
Mechanical Power Eng. Department
Post graduate Examination 2014-2015



Subject: Performance of ICE
Level: 600. Code: MPE618
Time Allowed: 3 hours
Total Marks :100 marks
Date of Exam : 23 /8/2020

Solve the Following Questions and assume any required data

(Question Number-1) :(25 Marks)

- (a) Discuss different operating variables that affect SI engine performance, efficiency and emissions. (6 marks)
- (b) Prove mathematically the relation between mixture quality and mean effective pressure in diesel engines. (6 marks)
- (c) Explain briefly why specific fuel consumption decreases when increasing engine load in SIE. (6 marks)
- (d) Interpret the role of ignition timing on maximum break torque in SIE and show also the role of octane number on ignition timing. (7 marks)

(Question Number-2) :(25 Marks)

- (a) Explain why in Diesel engines, the mixture required at no load condition is extremely lean while in spark ignition engine and at the same operating condition, the mixture must be rich enough to ensure stable operation. (6 marks)
- (b) Discuss effect of EGR on bsfc, exhaust temperature and spark advance in SIE. (6 marks)
- (c) Discuss injection parameters on diesel engine performance and emission. (6 marks)
- (d) Prove mathematically the relation between engine torque and break mean effective pressure. (7 marks)

(Question Number-3) :(25 Marks)

- (a) Discuss different factors affecting flame speed in gas turbine combustors. (8 marks)
- (b) Determine the atomization parameters that affect turbulent flame speed in gas turbine combustors. (8 marks)
- (c) According to ignition theory, discuss the relation between mixture quality and minimum ignition energy. (9 marks)

(Question Number-4) : (25 Marks)

- (a) What are the ignition conditions required to obtain sustainable and stable combustion in GT. (8 marks)
- (b) Discuss different methods used to ensure flame stabilization in gas turbine combustors. Draw sketch for each design. (8 marks)
- (c) Compare between different ignition methods employed in GT combustors. (9 marks)

Good luck