UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
SEPT 2016 SESSION

SUBJECT CODE	:	LGB 31603
SUBJECT TITLE	:	MARINE POWER PLANT & AUX. SUPPORT SYSTEM
LEVEL	:	BACHELOR DEGREE
TIME / DURATION	:	2 HOURS
DATE	:	

INSTRUCTIONS TO CANDIDATES

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1. Please read the instructions given in the question paper CAREFULLY.

2. This question paper is printed on both sides of the paper.

3. Please write your answers on the answer booklet provided.

4. Answer should be written in blue or black ink except for sketching, graphic and illustration.

5. Answer only FOUR (4) out of FIVE (5) questions.

6. Answer all questions in English.

THERE ARE 3 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

INSTRUCTION: Answer FOUR (4) out of FIVE (5) Questions

Question 1

With reference to marine internal combustion engine:

a. Sketch, labels and explain in detail the timing cycles for a two stroke-engine.

(15 Marks)

b. A 42.5 kW engine has a mechanical efficiency of 85%. Calculate the indicated power and frictional power. If the frictional power is assumed to be constant with load, determine the mechanical efficiency at 60% of the load. (10 Marks)

Question 2

Steam at a pressure of 60 bar and temperature of 550°C is fed to a steam turbine from a boiler. In the turbine, the steam is expanded isentropically to a pressure of 1 bar. The steam is then exhausted into condenser where it is condensed but not undercooled. The condensate is then pumped back into boiler, determine:

a The supplied energy to the feed water per kilogram of steam generated (8 Marks)

b The dryness fraction of the steam when entering condenser (8 Marks)

c The Rankine efficiency (9 Marks)

Question 3

A gas turbine is a rotary machine, similar in principle to a steam turbine. Effort to design a working gas turbine engine (GTE) had been under way for years prior to World War 2. It started to be used onboard combat aircraft and naval ship because of its high power to weight ratio and lately it become popular to be used onboard LNG Carrier, Fast Ferry and Hovercraft.

a. Sketch and labels basic component of a GTE and identify the function of each sections.
(10 Marks)

b. Sketch and labels P-v and T-s diagram (Ideal Brayton Cycle) and distinguish thermodynamic processes that occur in the GTE operation. (15 Marks)

Question 4

With reference to a screw pump fitted for fuel oil system onboard a ship:

Justify FIVE (5) usual checks and maintenance that need to be carried out on the unit.

(15 marks)

Discuss the procedure for operating a screw pump.

(10 marks)

Question 5

a) Sketch and label a Vapors Compression Refrigeration System naming the four main component of the system including the controls and safety equipment incorporated in the system.   (7Marks)

b) Describe the operation of the system.   (8 Marks)

c) Determine one (1) reason for the following abnormalities for the system.
   i)   Compressor knocking   (2 Marks)
   ii)   High discharge pressure   (2 Marks)
   iii)   Low discharge pressure   (2 Marks)
   iv)   Compressor frequently start and stop   (2 Marks)
   v)   Compressor continuous running without stopping   (2 Marks)

END OF QUESTION