



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 7 Examination in Engineering: July 2017

Module Number: ME7311

Module Name: Advanced Marine Engineering

[Three Hours]

[Answer all questions, each question carries twelve marks]

Clear labeled sketches will be given credits

- Q1 a) Sketch and describe the operation of a non-follow up steering gear system. [4 Marks]
- b) Distinguish clearly the operation between follow up and non-follow up steering gear systems. [2 Marks]
- c) State four main assumptions made in designing an electric steering gear system. [2 Marks]
- d) Describe the operation of Ward Leonard all electric type steering gear system using a clear labelled sketch. [4 Marks]
- Q2 a) With reference to transmission line of a ship explain,
(i) Shafting line is angled and lubricating oil tank is left open to shaft even at stay.
(ii) Plummer blocks are of different designs according to their location. [3 Marks]
- b) Sketch a water lubricated stern tube and explain its operation. [3 Marks]
- c) Draw a diagram to show type of stresses shafts are subjected to. [3 Marks]
- d) Draw a sketch to show types of cavitation caused on a propeller. [3 Marks]

- Q3 a) Draw timing diagrams to indicate both the 2 stroke and 4 stroke cycles to include all aspects of marine diesel engine operation. [4 Marks]
- b) State causes that may occur for crank shaft deflection. [4 Marks]
- c) Explain the procedure employed to check deflection of a crank shaft. [2 Marks]
- d) List the advantages of a turbo charged engine over a naturally aspirated engine. Explain types of turbo charging methods used in marine diesel engines. [2 Marks]
- Q4 a) Sketch and describe an automatic sprinkler system for combating fire in passenger spaces on a ship. [4 Marks]
- b) Sketch a Soda-Acid type portable fire extinguisher and explain its operation indicating operating time, chemical reaction, area of coverage and recharging after use. [4 Marks]
- c) List the reasons that could cause a fire onboard ship. [2 Marks]
- d) State classes of fire. [2 Marks]
- Q5 a) Sketch and describe a Three-room Temperature Brine Circuit of a Refrigerating Plant installed in ships. [4 Marks]
- b) Explain the defrosting methods of refrigeration plants. [2 Marks]
- c) Prepare a list of safety devices fitted in the Air conditioning and refrigeration plants on par with SOLAS. [2 Marks]
- d) Sketch and describe a Double Duct Air Conditioning plant used in ships. [4 Marks]