

MARINE DEPARTMENT — NEW ZEALAND

EXAMINATION OF ENGINEERS
IN THE MERCANTILE MARINE

Specimen Set of Examination
Papers for Engineer of a
Local Motor Ship

Exn. 1c

These Examination Papers relate to Examinations held under the
Regulations published in 1939 (Exn. 1A (1939))



ENGINEERING KNOWLEDGE

Time Allowed: Two and a Half Hours

1. Explain clearly the cycle of events which take place in the cylinder of a four-stroke cycle petrol engine. Commence with the piston on top centre of the firing stroke and continue until the piston returns again to this point. State briefly the fundamental difference between a petrol and a Diesel engine.
2. In a clear manner explain the method employed to lubricate the following parts of a Diesel engine:
 - (1) Main bearings;
 - (2) Crankpin bearings;
 - (3) Camshaft bearings; and
 - (4) Gudgeon pin bearings.

What would be the effect of dirt in the oil system, and how is unavoidable dirt dealt with?
3. Describe, with the aid of a rough sketch, the arrangements made to support the propeller shaft through the stern of the vessel, showing the provision made to prevent entry of water.
4. Explain, with the aid of a simple sketch, the construction of an electric cell. State at what voltage you would consider the cell to be—
 - (1) Fully charged;
 - (2) Discharged.

How is recharging carried out?
5. Describe how you would proceed to ascertain and rectify the fault when—
 - (1) A petrol engine stops; and
 - (2) A Diesel engine fails.
6. Fully describe the possible causes of fire in the machinery space of a motor vessel. What particular attention should be given to the management of the engine room to reduce the fire risk? Explain the principle on which most fire-extinguishers work.

ARITHMETIC

Time Allowed: Two Hours and a Half

1. The distance between two ports is 276 miles and a vessel does the trip in 1 day 12 hours 30 minutes. What is the average speed in miles per hour?
2. The total weight of a barrel of grease is 2 cwt. 2 qr. 16 lb. The empty barrel weighs 52 lb. The cost, including the barrel, is £14 12s. 6d. What is the cost of the grease per pound?
3. An engine runs at 250 revolutions per minute. The counter, at 9.30 a.m. reads 629,654. When will the counter read 714,294?
4. An oil tank measures 4 ft by 4 ft by 3 ft deep. In 24 hours the oil falls 8 in. in the tank. What is the consumption of oil per hour in gallons?
5. An engine room bulkhead measuring 18 ft 3 in. by 7 ft 9 in. is to be covered with galvanized iron. How many square feet of iron would be required?
6. The stuffing box of a 4 in. diameter propeller shaft measures 6 in. diameter and is 6 in. long. What length of 1 in. square packing would be required to fill the box, providing the gland is entered 1 in. before tightening the nuts.

VERBAL EXAMINATION

A verbal examination will be conducted on conclusion of the written work.