EXAMINATION OF MARINE ENGINEER OFFICER 24 02 MEKM
Function: Marine Engineering at Management Level
MARINE ENGINEERING KNOWLEDGE (MOTOR)
M.E.O. Class II
India (February 2024) (Time allowed - 3hours) Total Marks 100

NB: (1) Answer 6 Questions only
(2) All Questions carry equal marks
(3) Neatness in handwriting and clarity in expression carries weightage
(4) Illustration of an Answer with clear sketches / diagrams carries weightage.
(5) All unused pages of the answer script must be cancelled out by two lines (X) across the page.
(6) Write the full Question before attempting to write the answer to same.

1. Sketch a cross section through a **piston rod stuffing box**.
   (a) Define with detail sketches the function of and difference between, sealing rings and scraper rings.
   (b) Identify with reasons those details which should receive particular attention during overhaul of the complete assembly.
   (2015 Jul 08) (2024 Feb 01)

2. With reference to behaviour of **fabricated bed plates and frames** in services:
   (a) Identify various forces imposed simultaneously upon them;
   (b) Explain how engine structure withstands these forces;
   (c) State how these forces are transferred to ship's structure.
   (2014 Jun 06) (2016 Jan 06) (2017 Feb 06) (2018 Jan 06) (2019 Dec 02) (2022 Oct 05) (2024 Feb 02)

3. Explain the **modern methods of turbocharging** available such as:
   (a) Pulse Converter System
   (b) Sequential turbocharging
   (c) Two stage turbocharging
   (d) Variable Geometry turbochargers
   (2013 Jan 09) (2024 Feb 03)

4. With respect to carriage of LNG as bunker on board ship & subsequent consumption of the fuel in the diesel engine, discuss:
   (a) Types of bunker tank arrangement
   (b) Liquefied gaseous fuel containment safeties
   (c) Bunkering Requirements
   (New Question)(2024 Feb 04)

5. During a routine crankcase inspection, a **main engine top end bearing** is found wiped and subsequent inspection shows that the pin is badly scored.
   (a) Explain in detail the action which should be taken to enable the engine to be safely operated so that the vessel may reach a port where effective repair facilities are available.
   (b) State with reasons the factors which influence the speed at which the engine may be safely operated.
   (2010 Oct 02) (2012 Oct 07) (2012 Nov 07) (2013 Dec 06) (2014 Jun 04) (2016 Jan 04) (2017 Feb 04) (2018 Jan 04) (2021 Jul 02) (2023 Aug 04) (2024 Feb 05)

6. (a) Sketch and describe a **flywheel** that would be fitted to a large marine diesel engine. (8)

   (b) Explain the role of the flywheel during engine starting and stopping operations, including its function in providing momentum for initial engine rotation (4)

   (c) Discuss the recent advancements in flywheel technology for main engines, such as light-weight materials, enhanced designs, or integrated monitoring systems. (4)

   (New Question) (2024 Feb 06)

7. (a) Compare the advantages of **forged and built-up crankshafts** with special reference to the magnitude of the stresses in the cranks;
   (b) How would you check the deflections by means of a dial gauge through one revolution of the shaft?
   (c) How are the readings obtained interpreted?
   (d) How is wear-down measured?
   (2011 Aug 04) (2011 Nov 04) (2013 Sep 03) (2024 Feb 07)

8. Describe the procedure in **lining up an engine bed plate, main bearings, gear box, thrust block, propeller shafting and tail-end shaft**, assuming this to be a new ship.
   (2011 Aug 01) (2011 Nov 01) (2024 Feb 08)

9. Describe the developments that have taken place in the design of **bearings of slow speed marine diesel engines**, focussing on the reasons for such changes.
   (2023 Jan 03) (2024 Feb 09)
