SEAGOING ENGINEER OFFICER CLASS 2

CERTIFICATE OF COMPETENCY

ENGINEERING KNOWLEDGE - MOTOR

Time allowed: 3 hours

INSTRUCTIONS : -

This paper consists of NINE questions where

Candidates are required to attempt ANY SIX questions.

All questions carry equal marks.

Pass marks: 50 %

CANDIDATES ARE NOT ALLOWED TO WRITE ON OR DEFACE THIS PAPER

This paper consists of this page and THREE other printed pages.

Notes to Candidates:-

i) Write down your name in the top right-hand corner on the first page of the answer sheets.

ii) Write down the question number in the top left-hand corner on each page.

iii) Answer each question on a new page.

iv) No need to copy the questions' details onto the answer sheets.

v) Switch off all your mobile phones and communication devices when in the examination room.

vi) Return all the question paper(s), the used and unused answer sheets before leaving the examination room.

vii) Do not disturb other candidate(s) in the examination room.

viii) Do not attempt to take any photos or recordings of any question papers and/or answer sheets.

ix) The progress of the examination is being recorded by close-circuit television (CCTV) and voice recorders in the examination room.

If the above rules from item v) to viii) are infringed, candidates will be regarded as having failed the examination as a whole and will not be accepted for re-examination for such period as may be decided by the Director.

考生注意事項：-

i) 在答題紙首頁右上角寫上姓名。

ii) 在每頁答題紙的左上角標明回答的問題題號。

iii) 每一條問題另開新頁作答。

iv) 不需要抄寫問題到答題紙上。

v) 進入試場後，把手機及所有通信設備關閉。

vi) 離開試場前，交回所有試卷、所有用過和未用過的答題紙及草稿紙。

vii) 試場內不可干擾其他考生。

viii) 切勿嘗試拍攝或錄取任何試卷或答案。

ix) 考試期間試場內會有閉路電視(CCTV)和錄音系統進行記錄。

如果違反上述 v) 至 viii) 規則，即當作所有考試不及格，以及在處長決定的期間內不得重考。

1. (a) Sketch a transverse section of engine frame, entablature, bedplate etc. showing how the various components are held together.

   (b) State the causes of engine transverse, longitudinal and the combination of these movements while engine is in operation.

   (c) Apart from the rigidity imparted by engine frame. Entablature and bedplate, what devices are provided to restrict engine axial, vertical and rocking movements?

2. Explain how each of the following conditions affects engine performance:
   (a) stretch in camshaft chain;
   (b) Worn fuel pump barrels and plungers; and
   (c) Worn fuel valve nozzles.

3. With reference to exhaust gas turbocharger, explain:
   (a) the reason why the performance usually deteriorates in services;
   (b) how the reduction in performance is detected; and
   (c) what corrective actions can be done?

4. (a) Describe with sketches a double walled fuel pipe as commonly fitted between fuel pumps and injectors.

   (b) Explain why pipes of this design are now commonly used.

   (c) State what are the indications that such a pipe has fractured.

5. Explain why 'lost motion' is provided on some camshafts.
   Sketch and describe such an arrangement.

6. With reference to auxiliary boiler feed and contents, explain the significance of :

(a) dissolved solids;

(b) alkalinity;

(c) chlorinity; and

(d) hardness.

Explain the likely consequences of neglecting any one of these factors.

7. Suggest with reasons why the following practices in air compressor operation should be encouraged.

(a) maintaining the finest "bump" clearance in all stages;

(b) annealing bursting disc of the inter-cooler at regular intervals;

(c) restricting cylinder lubrication to absolute minimum; and

(d) regular cleaning of intake air filters

8. With reference to a large crankshaft :-

(a) Describe how crankshaft deflections are measured;

(b) State how the measurement can be checked for accuracy;

(c) What is the significance of crankshaft deflection measurement? and

(d) State four reasons for abnormal crankshaft deflection to occur.

9. (a) Sketch an arrangement for operating the fuel pumps of marine engines.

(b) Describe how it works and how pump timing is set.

(c) State how fuel pump is regulated to suit load.

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