



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE : LEB 10102
COURSE NAME : MARINE ELECTRO-TECHNOLOGY
PROGRAMME NAME : DIPLOMA OF ENGINEERING TECHNOLOGY IN
ELECTRICAL & ELECTRONICS (MARINE)
DATE : 30 MAY 2016
TIME : 08.00 AM – 11.00 AM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. Answer **FOUR (4)** questions only.
4. Please write your answers on the answer booklet provided.
5. Answer all questions in English / Bahasa Melayu language **ONLY**.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer only FOUR questions.

Please use the answer booklet provided.

Question 1

(a) Most of the industrial working environment has a risk especially in working with electricity. The risk might result in physical damage or loss of life or property. Explain how does electricity act on human body when electrocuted happened.

(5 marks)

(b) Electric shock can occur due to direct or indirect contact. Electrical shock occurs when a part of the body completes a circuit between conductors or a grounding source. Identify four (4) of the cause of electric shock happened because of unsafe work method and defect in the electrical system.

(8 marks)

(c) The wiring and installation of electrical system is needed to run up electrical equipment and facilities. In order to complete a wiring and installation of electrical system, a number of tests need to be conducted before it can be confirmed that the system is in a good function and safe. List down four (4) of the test needed in this process and explain the function each of the test.

(12 marks)

Question 2

- (a) A series RLC circuit having a resistance of $30\ \Omega$, an inductor of $150\ \text{mH}$ and a capacitor of $200\ \mu\text{F}$ is connected with an AC supply voltage of 250V , 50Hz . Calculate:
- The impedance of the circuit.
(7 Marks)
 - Draw the impedance phasor diagram including the phase angle and the values of resistance and reactance.
(2 Marks)
 - The current.
(2 Marks)
 - Voltage across all loads
(6 Marks)
 - Power
(2 Marks)
- (b) In three phases AC circuit, there are two types of connection can be connected to load. State these two (2) types of connection in three phases and draw the load wiring diagram of these two types.
(6 Marks)

Question 3

- (a) State two (2) advantages of AC transformer. (2 Marks)
- (b) State the definition of transformer and explain how it works. (5 Marks)
- (c) Explain briefly the meaning of ideal transformer. Illustrate precisely the equivalent circuit of ideal transformer and state the relevant equations. (6 Marks)
- (d) A 200kVA transformer has 600 primary turns and 150 secondary turns. The primary and secondary resistances are 0.25Ω and 0.01Ω respectively and the corresponding leakage reactance are 1.0Ω and 0.04Ω respectively. Determine:
- The equivalent resistance, reactance and impedance referred to the primary winding. (6 Marks)
 - The phase angle of the winding. (2 Marks)
- (e) A 200kVA rated transformer has a full load copper loss of 1.5kW and an iron of 1kW. Determine the transformer efficiency at full load and 0.85 power factor. (4 Marks)

Question 4

- (a) In thermal power plant generation system, turbine is one of the importance parts to rotate the generator to produce electricity. Explain the operation of turbines in thermal generating stations.

(10 Marks)

- (b) Practically, the whole electrical energy we consume daily comes from mechanical energy conversion. This conversion is performed in power generating stations. Figure below shows a simplified schematic diagram of a hydroelectric power plant. Analyses the Figure 1 below and describe its principle of operation.

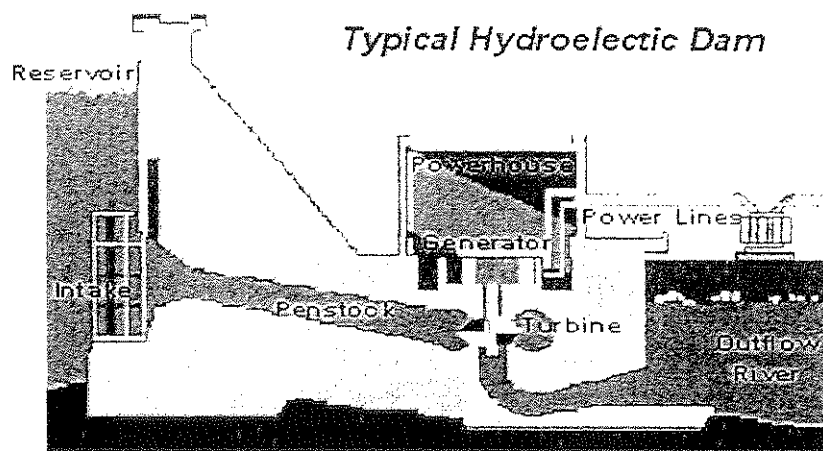


Figure 1

(10 Marks)

- (c) A nuclear generating station is a power plant that uses uranium as a source of energy produce electricity. Nuclear power produces around 11% of the worlds energy needs and produce large amount of energy. State five (5) advantage of nuclear reactor for other types of power plant.

(5 Marks)

Question 5

- (a) There are several types of DC motor widely used in any industries. Define two of DC motor types; your answer must include the explanation of each types, drawing of the electrical diagram and formula associated from current and voltage

(12 Marks)

- (b) A 200V, DC shunt-wound motor has an armature resistance of 0.4Ω and at a certain load has an armature current of 30A and runs at 1350 rev/min. If the load on the shaft of the motor is increased so that the armature current increases to 45A, determine the speed of the motor, assuming the flux remains constant.

(7 Marks)

- (c) A series motor has an armature resistance of 0.2Ω and a series field resistance of 0.3Ω . It is connected to a 240V supply and at a particular load runs at 24 rev/s when drawing 15A from the supply.

- i. Determine the generated e.m.f. at this load.
- i. Calculate the speed of the motor when the load is changed such that the current is increased to 30A. Assume that this causes a doubling of the flux.

(6 Marks)

END OF QUESTIONS

