



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2016/2017**

COURSE NAME : MEDICAL EQUIPMENT  
MANAGEMENT AND SAFETY

COURSE CODE : BEU 40902

PROGRAMME : BEJ

EXAMINATION DATE : JUNE 2017

DURATION : 2 HOURS 30 MINUTES

INSTRUCTION : ANSWER ALL QUESTIONS  
IN THIS QUESTION PAPER

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THIS QUESTION PAPER CONSISTS OF **TEN (10)** PAGES

**Q1** (a) A biomedical engineer engages in professional practice in healthcare system in which patient care is delivered.

(i) Generate a list of testing, maintenance and service that are generally conducted in the correct order by a biomedical engineer in hospital.

(5 marks)

(ii) Summarize activities involved in plan preventive maintenance (PPM).

(8 marks)

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(iii) Identify **TWO (2)** documents that should be included in service report when conducting PPM.

(2 marks)

- (b) Testing of medical equipment is carried out to ensure the device does not cause electrical hazards to patients, maintenance personnel's and users. Tabulate the physiological effects that may occur due to **FOUR (4)** different leakage current flow ranging from 1 mA to 100 mA.

(8 marks)

**Q2** (a) Medical technology management is a systematic process that begins with strategic planning, technology assessment, and facilities planning.

- (i) Describe **THREE (3)** general advantages of implementing technology assessment.

(3 marks)

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- (ii) Establish **SIX (6)** problems that will occur if there is a lack in technology assessment performed by biomedical engineers.

(6 marks)

(b) Equipment management (EM) number can be used to schedule preventive maintenance of medical equipment.

(i) Calculate the score to plan the maintenance schedule using information given in **Table Q2(b)**. Show your formula and calculations clearly.

(4 marks)

**Table Q2(b)**

| Devices       | Function | Risk | Maintenance |
|---------------|----------|------|-------------|
| Defibrillator | 10       | 5    | 4           |
| Fetal monitor | 6        | 3    | 3           |
| Ultrasound    | 6        | 3    | 1           |
| Pacemaker     | 10       | 5    | 4           |

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(ii) Based on **Q2(b)(i)**, choose the diagnostic devices that should be included in the equipment control program.

(2 marks)

(iii) Justify your answer in Q2 (b)(ii).

(2 marks)

(c) All medical equipment is divided into equipment classes and type.

(i) Define the term equipment classes and equipment type.

(3 marks)



(ii) Ventilator, defibrillator, infusion pump and pulse oximeter are common medical equipment found in intensive care unit (ICU). Classify the following medical equipment based on both equipment classes and type.

(8 marks)

**Q3** (a) IEC 60601 is a series of technical standards for the safety and effectiveness of medical electrical equipment.

(i) Indicate **SIX (6)** tests conducted by safety analyzer to fulfill IEC 60601 standard.

(6 marks)

(ii) Name the non-functional current.

(1 mark)



(iii) Summarize **THREE (3)** non-functional current using appropriate diagram. Label clearly the current path.

(9 marks)

(b) The use of computer hardware and software to manage health care information is expanding. Point out **THREE (3)** impacts of information technology (IT) on:

(i) Health care.

(3 marks)

(ii) Inpatient care.

(3 marks)

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(c) Hospital accreditation is a mechanism for recognition of an institutional competence.

(i) Name the surveys involved in hospital accreditation process.

(3 marks)

(ii) Explain **THREE (3)** general benefits of hospital accreditation. (3 marks)

(d) Malaysian Society for Quality in Health (MSQH) is an independent accrediting body that is involved in accreditation of hospital in Malaysia. Simplify surveyor activities into a checklist to be used during accreditation visit in hospital. (6 marks)

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**Q4** (a) Electromagnetic compatibility (EMC) is the condition which exists when equipment is performing its designed functions. Identify **THREE (3)** scenarios of Electromagnetic interference recognition.

(3 marks)

(b) Point out **FIVE (5)** guidelines to manage issues related to electromagnetic interference (EMI) and electromagnetic interference compatibility (EMC) within healthcare setting.

(5 marks)

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(c) Medical waste covers all waste produced in healthcare or diagnostic activities. Classify hazardous medical waste related to:

(i) Internal human waste. (3 marks)

(ii) Drugs (2 marks)

(iii) Materials and substances (2 marks)

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– END OF QUESTION –