Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014

COURSE NAME	:	TELEMEDICINE
COURSE CODE	:	BEU 40803
PROGRAMME	:	4 BEJ
EXAMINATION DATE	:	JANUARY 2014
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Telemedicine can be identify in four different types which are tele-consultation, tele-monitoring, tele-surgery and tele-education. Describe these four types of telemedicine.

(6 marks)

(b) Clinical education via the internet is one types of tele-education that offer wide range of applications such as continuing medical education (CME). Point out on how CME can be experienced by the clinicians or healthcare workers.

(4 marks)

(c) Data are sent across internet networks to provide information sharing with worldwide coverage.

(i) Define the words data packet and data overhead.

(4 marks)

(ii) Produce the relation between these two terms regarding information flood prevention in internet networks.

(2 marks)

(d) Analyse the benefit and the obstruction of internet in telemedicine.

(4 marks)

Q2 (a) Draw a block diagram of the basic communication system with the presence of noise and describe the system.

(4 marks)

(b) Generally, there are two forms of communication systems used in telemedicine services which are wired and wireless communication.

(i) Give the definitions of wired and wireless communications.

(4 marks)

(ii) By comparing with the wired communication, evaluate why the wireless communication is a preferred option in most telemedicine applications.

(3 marks)

(c) Loss of wireless signal strength or fading effect can be compensated by clearance of the Fresnel zone.

(i) Define the Fresnel zone.

(2 marks)

(ii) Explain how the clearance of the Fresnel zone could compensate signal degradation in wireless networks.

(2 marks)

(iii) Given that the signal frequency is 2.4 GHz and the link distance between two antennas is 50 km, calculate the First Fresnel Zone Radius at the mid-point.

(3 marks)

(iv) Predict the structure of the First Fresnel Zone by using an illustration (Note: assumes antennas at same height).

(2 marks)

Q3 (a) Figure **Q3(a)** demonstrates the relationship between Electronic Health Record (EHR), Electronic Medical Record (EMR) and Personal Health Record (PHR). According to Figure **Q3(a)**, distinguish these three terms.

(6 marks)

(b) Clinical Decision Support System (CDSS) is one of disirable components in Electronic Health Records (EHR) system.

(i) Describe the Clinical Decision Support System (CDSS).

(2 marks)

(ii) There are several applications available for Clinical Decision Support System (CDSS). Explain two (2) of them.

(4 marks)

(c) "The diagnosis process for providing the best possible treatment would vastly depend on the effectiveness of knowledge management for electronic patient records". Evaluate the statement.

(4 marks)

(d) Secure network access and data transmission are critical to the confidentiality and privacy of personal medical data. Analyse the technical ways to help providing secure network access and data transmission.

(4 marks)

Q4 (a) Distinguish between continuous-time (CT) signal and discrete-time (DT) signal.

(4 marks)

(b) For **Q4(b)(i)-(vi)**, classify each of the signals as CT or DT signals and specify either an appropriate unit of time for each signal or the independent variable (if it is not time).

(i) The instantaneous velocity of the left heel during a long jump.

(ii) The concentration of calcium inside a muscle cell.

(iii) The amount of blood ejected from the left ventricle with each heartbeat.

(iv) Pressure inside the eyeball.

(v) The average velocity of red blood cells in a pulmonary capillary.

(vi) The number of nerve cells in a thin slice of the brainstem, where each slice is taken from a different experimental animal but from the same location.

(12 marks)

(c) Artificial Neural Networks (AAN) is one of classification systems that find application in a Clinical Decision Support System (CDSS) framework. Summarise the AAN as a classification method.

(4 marks)

Q5 (a) Conclude Malaysia health policy and strategy towards telemedicine.

(3 marks)

(b) Malaysia's Telemedicine Blueprint "Leading Healthcare into the Information Age" provides conceptual framework to leap a whole generation from industrial age medicine to information age healthcare system.

(i) Distinguish between the industrial age medicine system and the information age healthcare system.

(4 marks)

(ii) Analyse the needs of the healthcare transformation.

(4 marks)

(c) A central focus in medical informatics is the information base that constitutes the essence of medicine and data, knowledge, and information

are the three terms frequently used to describe the content of computer-based systems.

(i) Evaluate the relation between data, knowledge, and information.
(5 marks)

(ii) Classify between a database and knowledge base.
(4 marks)

- END OF QUESTION –

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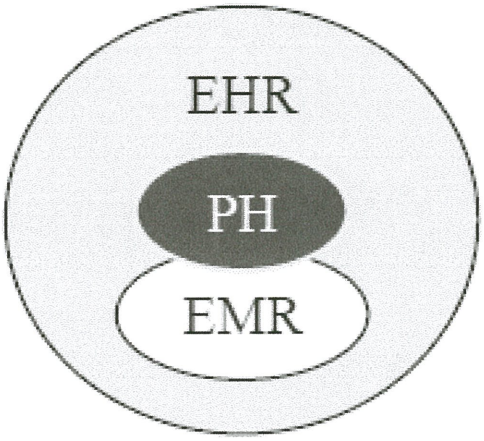

FIGURE Q3(a)