

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI 1 2015/2016

BEU5183: ARTIFICIAL INTELLIGENT

TARIKH : 7 JANUARI 2016

MASA : 8.30 AM – 11.30 AM (3 JAM)

Kertas ini mengandungi **TUJUH (7)** halaman bercetak.

Bahagian A: Struktur (10 soalan)

Bahagian B: Esei (3 soalan)

Dokumen sokongan yang disertakan : Kertas Graf, Formula dsb / Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A : 40 MARKS**BAHAGIAN A : 40 MARKAH****INSTRUCTION:**

This section consists of **TEN (10)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi **SEPULUH (10)** soalan berstruktur. Jawab **semua soalan**.

QUESTION 1CLO1
C1

Define Artificial Intelligence (AI) and **TWO (2)** applications' area.

[4 marks]

Takrifkan Artificial Intelligence (AI) dan nyatakan **DUA (2)** bidang penggunaannya.

[4markah]

QUESTION 2CLO1
C2

Describe **TWO (2)** application of the Baye's rule in 'Artificial Intelligence.

[4 marks]

Jelaskan **DUA (2)** penggunaan kaedah Baye's dalam 'Artificial Intelligence

[4markah]

QUESTION 3CLO1
C4

Analyze the expression of $P(H_i|E)$ in Baye's theorem.

[4 marks]

Terangkan maksud persamaan $P(H_i | E)$ dalam teorem Baye's.

[4markah]

QUESTION 4CLO1
C3

Determine **TWO (2)** the fuzzy variable corresponding to these real variables for the everyday life application.

[4 marks]

a. Speed measured in meters per second.

b. A TV show measured in how much you are interested watching.

Tentukan **DUA (2)** pembolehubah fuzzy sepadan dengan

[4markah]

pembolehubah sebenar untuk aplikasi kehidupan sehari-hari.

a. Kelajuan diukur dalam meter sesaat.

b. Satu pertunjukan TV diukur dari berapa banyak yang andaberminat untuk menontonnya.

CLO2 C5	<p>QUESTION 5</p> <p><i>Arrange the steps of the supervised training algorithm.</i></p> <p><i>Susun langkah-langkah proses algoritma supervised training.</i></p>	<p>[4 marks]</p> <p>[4markah]</p>
CLO2 C3	<p>QUESTION 6</p> <p><i>Assign the limitations of expert systemsArtificial Intelligence (AI).</i></p> <p><i>Tentukan kekurangan Expert System dalam Artificial Intelligence.</i></p>	<p>[4 marks]</p> <p>[4markah]</p>
CLO2 C3	<p>QUESTION 7</p> <p><i>Sketch the diagram of the Expert Systems Components</i></p> <p><i>Lakarkan gambarajah blok komponen bagi Expert system</i></p>	<p>[4 marks]</p> <p>[4markah]</p>
CLO2 C5	<p>QUESTION 8</p> <p><i>Summarize FOUR (4) sources of uncertainty knowledge in Expert System.</i></p> <p><i>Ringkaskan EMPAT (4) sumber bagi uncertainty knowledge dalam Expert System.</i></p>	<p>[4 marks]</p> <p>[4markah]</p>
CLO1 C3	<p>QUESTION 9</p> <p><i>Compare TWO (2) advantages and disadvantages of fuzzy expert systems.</i></p> <p><i>Bandingkan DUA (2) kelebihan dan kelemahan bagi sistem fuzzy expert.</i></p>	<p>[4 marks]</p> <p>[4markah]</p>
CLO1 C4	<p>QUESTION 10</p> <p><i>Explain TWO (2) the application of Artificial neural network (ANN).</i></p> <p><i>Terangkan DUA (2) penggunaan Artifial Neural Network (ANN).</i></p>	<p>[4 marks]</p> <p>[4markah]</p>

SECTION B : 60 MARKS
BAHAGIAN B : 60 MARKAH

INSTRUCTION:

This section consists of THREE (3) essay questions. Answer ALL questions

ARAHAN:

Bahagian ini mengandungi TIGA (3) soalan esei. Jawab semua soalan.

QUESTION 1

The physicians find probability and statistics on incorrect reading of mammogram. It is not a surprise that physicians are way off with their interpretation of results.

Given that some tricky probabilities of the cases

- *One percent of women over 50 years have breast cancer.*
- *Ninety percent of women who have breast cancer test positive on mammograms.*
- *Eight percent of women will have false positives.* [10 marks]

CLO1
C4

- a. *Analyze the step parts of the equation.* [10 marks]

CLO1
C5

- b. *Formulate the probability that a woman has cancer if she has a positive mammogram result Calculate the probability statement for this cases*

Pakar perubatan mendapati kebarangkalian dan statistik keputusan mamogram adalah salah. Ia tidak menghairankan bahawa doctor memberi tafsiran kebarangkalian keputusan adalah salah. Berikut adalah data keputusan bagi kebarangkalian kes ini.

- *Satu peratus daripada wanita lebih 50 mempunyai kanser payudara.*
- *Sembilan puluh peratus daripada wanita yang mempunyai ujian kanser payudara positif pada mamogram.*
- *Lapan peratus wanita akan mempunyai positif palsu.* [10markah]

- a. *Analisis setiap persamaan-persamaan penyelesaian kes ini.* [10markah]

- b. *Rumuskan kebarangkalian bahawa seorang wanita mempunyai kanser jika dia mempunyai keputusan mamogram positif*

QUESTION 2

For speed control of a DC shunt motor, certain changes in the operating load is made on the basis of the rated load current. Two fuzzy sets are defined to represent the operating load current region, namely 'near' load current and 'in the region' of load current of 0.8 A. The two fuzzy sets are represented as:

$$A = \{0.1/0.7 + 0.6/0.75 + 0.8/0.8 + 0.3/0.85 + 0.2/0.9\}$$

$$B = \{0.0/0.7 + 0.8/0.75 + 0.9/0.8 + 1.0/0.85 + 0.7/0.9\}$$

[5 marks]

For the above fuzzy sets

a. *Elaborate a fuzzy set*

[7 marks]

b. *Calculate $A \cup B$*

[8 marks]

c. *Evaluate the minimum fuzzy relationship between $A \cap B$*

CLO2
C2
C4
C5

Untuk kawalan kelajuan DC motor pirau, perubahan tertentu dalam beban operasi itu dibuat atas dasar beban semasa. Dua set fuzzy ditakrifkan untuk mewakili kawasan semasa beban operasi, iaitu 'berhampiran' dan kawasan arus beban sebanyak 0.8 A. Kedua-dua set fuzzy diwakili sebagai:

$$A = \{0.1/0.7 + 0.6/0.75 + 0.8/0.8 + 0.3/0.85 + 0.2/0.9\}$$

$$B = \{0.0/0.7 + 0.8/0.75 + 0.9/0.8 + 1.0/0.85 + 0.7/0.9\}$$

[5 markah]

Daripada Fuzzy set diatas;

[7 markah]

a. *Huraikan fuzzy set*

[8 markah]

b. *Kirakan $A \cup B$*

c. *Nilaikan minimum fuzzy antara $A \cap B$*

QUESTION 3

Figure 1. shows the unit function of ANN

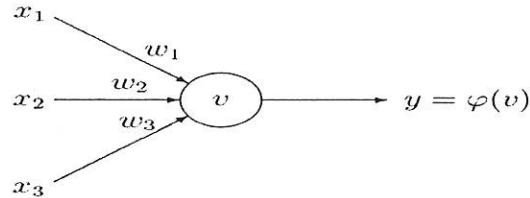


Figure 1

Suppose that the weights corresponding to the three inputs have the following values:

$w_1 = 2$
$w_2 = -4$
$w_3 = 1$

and the activation of the unit is given by the step-function:

$$\varphi(U) = \begin{cases} 1 & \text{if } U \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad [4 \text{ marks}]$$

[10 marks]

- a. Compute the the weighted sum
- b. Apply the activation function to U for each of the following input patterns:

pattern	P1	P2	P3	P4
X1	1	0	1	1
X2	0	1	0	1
X3	0	1	1	1

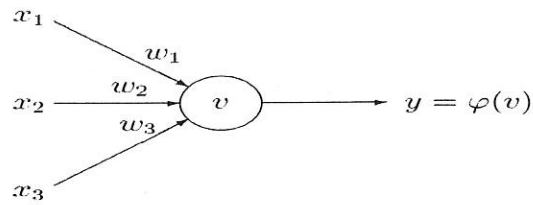
[6 marks]

- c. Evaluate the output value y of the unit

CLO2
C2
C3

C5

Rajah 1 menunjukkan satu unit function



Weight bagi tiga input mempunyai nilai-nilai berikut.

$w_1 = 2$
$w_2 = -4$
$w_3 = 1$

Dan step-function unit seperti berikut,

$$\varphi(U) = \begin{cases} 1 & \text{if } U \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

- a. Kira jumlah weight. [4 markah]
- b. Gunakan formula aktiviti function U bagi setiap pattern masukan (P) [10 markah]
- c. Nilaikan keluaran bagi unit y [6 markah]

SOALAN TAMAT