



UPNM

National Defence University of Malaysia

Kewajipan • Maruah • Integriti

NATIONAL DEFENCE UNIVERSITY OF MALAYSIA

SUNGAI BESI CAMP

57000 KUALA LUMPUR

FINAL EXAMINATION

DEGREE PROGRAMME

SEMESTER I ACADEMIC SESSION 2019/2020

Arial (12)
'Double spacing'

COURSE : ELECTROMAGNETIC FIELDS AND WAVES

COURSE CODE : EEE 3253

DURATION : 3 HOURS

**PROGRAMME : ZK25 / ZK50
CODE**

Arial (12)
'Double
spacing'

**INSTRUCTION :
ANSWER ALL QUESTIONS.**

THIS QUESTION PAPER CONTAINS **ELEVEN (11)** PAGES
INCLUDING THIS PAGE.

HASIL PEMBELAJARAN KURSUS ← Arial (12)

2 tab 'single spacing' ↓

CLO1	Explain basic principles, definitions and theories in 1 st and 2 nd Laws of thermodynamics	PLO1
CLO2	Apply the principles of thermodynamic in solving thermodynamic properties, energy, and entropy	PLO2
CLO3	Analyze engineering thermodynamic properties, energy, and entropy	PLO7
CLO4	Analyze engineering thermodynamics experimentally	PLO8

↑
Arial (12)

'Footer' / Arial (10)

Nyatakan semester peperiksaan dan kod kursus (S1) untuk set satu dan (S2) untuk set 2

SECTION A
ANSWER ALL QUESTIONS
QUESTION 1 (25 MARKS)



Setiap soalan bermula dengan muka surat baru.
Contoh Arahan:
Arial (12) / Spacing: 1.5

- a. Is it possible for a heat engine to operate without rejecting any waste to a low-temperature reservoir? **Explain.** → Bold action word for identify level of Bloom.

→
1 cm spacing.

Single tab 1.5
spacing

↓
(CLO1:PLO1 - 5 Marks)
↑

- b. One fine day, when a man returns to his well-sealed house, he finds that the house was warm with temperature at 35 °C. He turns on the air conditioner, which cools the entire house to 20 °C in 30 minutes. If the coefficient of performance (COP) of the air-conditioning system is 2.8, **determine** the power drawn by the air-conditioner. Assume the entire mass within the house is equivalent to 800 kg of air for which the $C_v = 0.72 \frac{kJ}{kg} ^\circ C$ and $C_p = 1.0 \frac{kJ}{kg} ^\circ C$

Arahan untuk pecahan
CLO & PLO (1 CLO akan
mapping ke 1 PLO) utk
memudahkan penjajaran
konstruktif disukat

(CLO2:PLO2 - 8 marks)

BAHAGIAN B

JAWAB DUA (2) SOALAN SAHAJA

Setiap soalan bermula dengan muka surat baru.

Contoh Arahan:

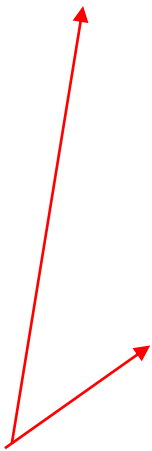
Arial (12) / Spacing: 1.5

SOALAN 2 (25 MARKAH)

- a. Starting with the second Tds relation $ds = \frac{dh}{T} - \frac{vdP}{T}$ proof $s_2 - s_1 = C_p \ln \frac{T_2}{T_1} - R \ln \frac{P_2}{P_1}$ for the entropy change of ideal gases under constant specific heat assumption and what is the different between the entropies of air at 105 kPa and 30 °C and air at 275 kPa and 10 °C per unit mass basis.

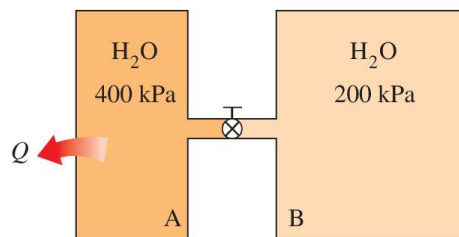
(CLO2:PLO2 – 10 marks)

- b. **Figure Q2 (b)** shows a boiler supplied a steam at 6MPa pressure and 500 °C temperature enters a two-stage adiabatic turbine at a rate of 15 kg/s. 10 percent of the steam is extracted at the end of the first stage at pressure of 1.2 MPa for other use. The remainder of the steam is further expanded in the second stage and leaves the turbine at 20 kPa.
- Determine the power output of the turbine, assuming the process is reversible.
 - If the turbine has an isentropic efficiency of 88 percent and entrance temperature at second stage is 350 °C, determine the exit temperature of steam and the power output for the turbine.



Antara soalan dan pecahan soalan, seperti format soalan ini.

(CLO3:PLO7 – 15 marks)



Gambarajah di tengah selepas soalan

Figure Q2 (b)

Table Q2 (b): Boiler Temperature

No	Temperatures	Location
1	200F	No 1
2	250F	No 2
3	265F	No 3
4	276F	No 4

Arahan untuk 'Table'
Tajuk berada di tengah table.
Jarak adalah 1.5
Arial (12)

-END-

Perkataan 'END' bermaksud
pengakhiran soalan