



UNIVERSITI  
TEKNOLOGI  
PETRONAS

## FINAL EXAMINATION MAY 2024 SEMESTER

**COURSE** : YBB4233 - NEW ENERGY  
**DATE** : 1 AUGUST 2024 (THURSDAY)  
**TIME** : 9:00 AM - 1:00 PM (4 HOURS)

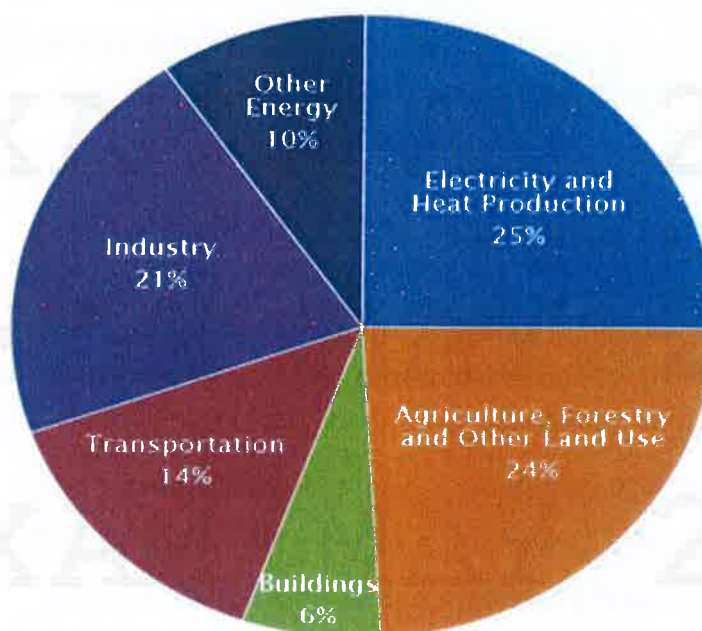
### INSTRUCTIONS TO CANDIDATES

1. This is an online open-book final examination. Students can access to Ulearn, notes, books & reading materials only. Other websites are not allowed.
2. Answer **ALL** questions in the Answer Booklet.
3. Begin **EACH** answer on a new page in the Answer Booklet.
4. Indicate clearly answers that are cancelled, if any.
5. Where applicable, show clearly steps taken in arriving at the solutions and indicate **ALL** assumptions, if any.
6. **DO NOT** open this Question Booklet until instructed.

**Note** :

- i. There are **THREE (3)** pages in this Question Booklet including the cover page .
- ii. **DOUBLE-SIDED** Question Booklet.

1. **FIGURE Q1** shows the global greenhouse gas emissions by economic sector. Reduction in greenhouse gas (GHG) emission from the electricity and heat production sector is required to support Malaysia in meeting its Nationally Determined Contribution (NDC) 2030 target of 45% reduction in GHG emission intensity per unit of Gross Domestic Product (GDP), as compared to the 2005 level. Sustainable Energy Development Authority (SEDA) Malaysia had reported that as of 2020, the installed capacity of renewable energy in Malaysia has reached 8,450 MW. SEDA had also reported that Malaysia has abundant renewable resources readily exploitable for the electricity and heat production at 275 GW of potential with availability of resources that may be utilized in the longer term. Considering the advantages of the available renewable resources in Malaysia, discuss in detail the potential to decarbonize the electricity and heat production sector in Malaysia.



**FIGURE Q1:** Global GHG emission by economic sector [International Panel on Climate Change, 2023]

[40 marks]

2. The National Biomass Action Plan (NBAP) 2023 – 2030 outlines Malaysia's focus on the abundant biomass resources found in plantations, forests, agriculture, livestock and fisheries sectors. The estimated biomass potential from these sectors is approximately 182.6 million tonnes per annum, with a significant portion of 85.17% derived from the oil palm industry. Despite ongoing efforts to develop the biomass industries, a significant amount of biomass remains underutilised due to various factors. In our effort to decarbonize the transportation industry, propose **THREE (3)** technologies in detail to valorise the underutilised biomass in producing transportation fuel. Your proposal must also include the relevant international standard on fuel specification to determine the quality of transportation fuel, type of reactions involved and reaction conditions.

[60 marks]

– END OF PAPER –

