THE HONG KONG POLYTECHNIC UNIVERSITY

Department of Aeronautical and Aviation Engineering

Subject Title	:	Introduction to Aviation System and Air Transport Regulation	**Subject Code**	:	AAE2004
Session	:	Semester 1, 2022/23			
Date	:	16 December 2022	**Time**	:	15:15 – 18:15
Time Allowed	:	3 hours	**Subject Examiner(s)**	:	Dr Kam Ng Dr LT Hsu

This question paper has a total of __five__ pages (attachments included).
(Some pages may be intentionally omitted.)

Instructions to Candidates: This paper has two parts.
Part A consist of 10 questions.
Part B consist of 7 questions.
Answer **ALL** questions.

Constants : 1 mile = 1.6093 kilometres; 1 kilogram = 0.001 tonnes

Others : Nil

Available from Invigilator : Nil

DO NOT TURN OVER THE PAGE UNTIL YOU ARE TOLD TO DO SO

Part B – Short answers and long questions (80 marks)

Question 1 – Calculations (20 marks)

Flight AAE2004 operated with A350-900 flies for 1,500 miles. It carries 200 passengers (including 15 children who did not pay the fare; 5 airline senior management who are offered complementary tickets; and 20 adults redeem tickets). The total mass carried is 84.625 tonnes.

Assume the mass of an adult and a child is 75 kg and 50 kg, respectively. The average price of a passenger air ticket and cargo transportation fee per tonne is HKD 2,000 and HKD 5,000, respectively.

Seating details Seat map key

	Pitch/ Bed Length	Width	Seating details
Business	45 / 75	20	38 open suites
	Pitch	**Width**	**Seating details**
Premium Economy	40	20	28 recliner seats
Economy	32	18	214 standard seats

Figure 1. Seating details of A350-900

(a) Calculate the passenger-kilometre (PKM). (4 marks)

(b) Calculate the revenue passenger-kilometre (RPKM). (4 marks)

(c) Calculate the tonnes kilometre (TKM). (4 marks)

(d) Calculate the available seats kilometre (ASK). (3 marks)

(e) Calculate the passenger load factor (PLF). (1 mark)

(f) Calculate the passenger yield. (2 marks)

(g) Calculate the cargo yield. (2 marks)

Question 2 – Freedom of the air (10 marks)

PolyU Airways is an airline based in Hong Kong. The company would like to offer a one-way flight from London to Sydney. Singapore is chosen as an immediate stop for the flight for refuelling.

Which freedom(s) of the air is/are required? Briefly explain your choice.

Question 3 – AOC & Airlines (10 marks)

(a) List **FOUR** airlines having Air Operator's Certificate (AOC) issued by the Hong Kong Civil Aviation Department (HKCAD). (2 marks)

(b) State any **THREE** information that an AOC shall contains, at the minimal. (3 marks)

(c) Explain the difference(s) between flight number and tail number. You may illustrate with an example. (3 marks)

(d) List **ONE** airline registered in Hong Kong which is not holding HKAR-145 approval. Explain how their fleet undergo maintenance without HKAR-145 approval. (2 marks)

Question 4 – National aviation authorities (10 marks)

(a) State any **TWO** divisions of the HKCAD and explain the responsibilities of each division. (6 marks)

(b) Briefly explain the function of **TWO** documents issued by the HKCAD. (4 marks)

Question 5 – Airports and their future development (20 marks)

(a) List the **THREE** categories of airport facilities. (3 marks)

(b) What is the role of a terminal building? (2 marks)

(c) There are several infrastructure development works mentioned in the HKIA Master Plan 2030. State **THREE** of the works mentioned and explain how they can contribute to the HKIA. (9 marks)

(d) There are 15 alignment options of the HKIA third runway, which can be categorised into three main families. Explain any **THREE** factors considered during of grouping of alignment options. (6 marks)

Question 6 – Sustainable aviation systems (6 marks)

You are the engineering manager of an aviation consultant. You were tasked by your customer, the Hong Kong International Airport, to evaluate the sustainability of their airport. You shall prepare an interim review to discuss the perspective that you will include in your analysis. State **TWO** perspectives that you will consider and explain your choice.

Question 7 – Airspace (4 marks)

(a) State the definition of airspace. (2 marks)

(b) State the definition of air sovereignty. (2 marks)

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