UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2010/2011

COURSE NAME	:	INTRODUCTION TO AIRCRAFT
COURSE CODE	:	BDU 10202
PROGRAMME	:	1 BDT
EXAMINATION DATE	:	NOVEMBER / DECEMBER 2010
DURATION	:	1 HOUR 30 MINUTES
INSTRUCTION	:	ANSWER ANY **THREE (3)** QUESTIONS ONLY

THIS PAPER CONTAINS SIX (6) PAGES

ANSWER ANY THREE (3) QUESTIONS ONLY

1. i). Sketch an airliner and label any ten important parts of its anatomy.
(10 marks)

ii). Name the parts of the airliner responsible to make the airliner airborne. Explain how?
(20marks)

iii). An airliner of total weight 5000kg and wing area of $30m^2$ with coefficient of lift 2.1 is cruising at constant speed at an altitude of 10,000m. What is the minimum cruising speed possible? Take the air density as 1.200 kg/m^3.
(20marks)

2. i). Figure S2a shows a typical layout of instrument panel in the cockpit of a trainer aircraft. Label at least 5 instruments displayed on the instrument panel. You must use the figure as part of your answer script.
(10marks)

ii). Based on Figure S2b, describe the condition of flying that is being indicated.
(20marks)

iii). Based on Figure S2c, calculate the area of the vertical stabilizer if by deflecting the rudder, the C_L of the stabilizer becomes 1.5. Take the air density = 1.225kg/m^3 and aircraft velocity = 100km/hr.
(20marks)

3. i). Sketch a wing of an aircraft and label the external and internal important features.

(10marks)

ii). Explain how aircraft stall could take place and how could a pilot encounter this phenomenon.

(20marks)

iii). From Figure S3, calculate the aircraft engine minimum power needed to takeoff within 10 secs. The weight of the aircraft is given as 1150 kg.

(20marks)

4. i). Name the type of engines that are usually used to power airliners and state the advantages of a propeller engine aircraft as compared to the turbine engine aircraft.

(10marks)

ii). Sketch any aircraft turbine engine and describe its operation.

(20marks)

iii). An airliner is cruising at a constant speed of 100km/hr and powered by a turbojet engine. The aircraft has an equivalent wing area of $18m^2$ and the air density at the cruising height is $1.215kg/m^3$. Cruising at that speed, what is the engine exhaust speed indicated at the cockpit panel? Assume that the air mass flow rate entering and leaving the engine is constant at 80kg/sec, and take C_d of wing at cruising configuration as 0.4.

(20marks)

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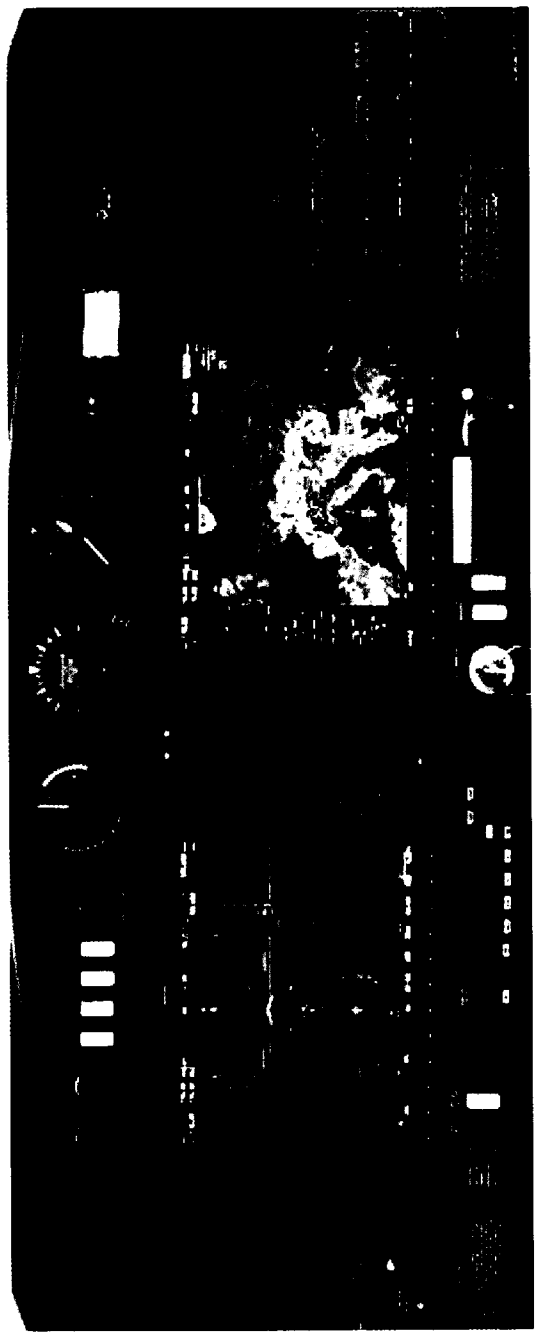

Figure S2a

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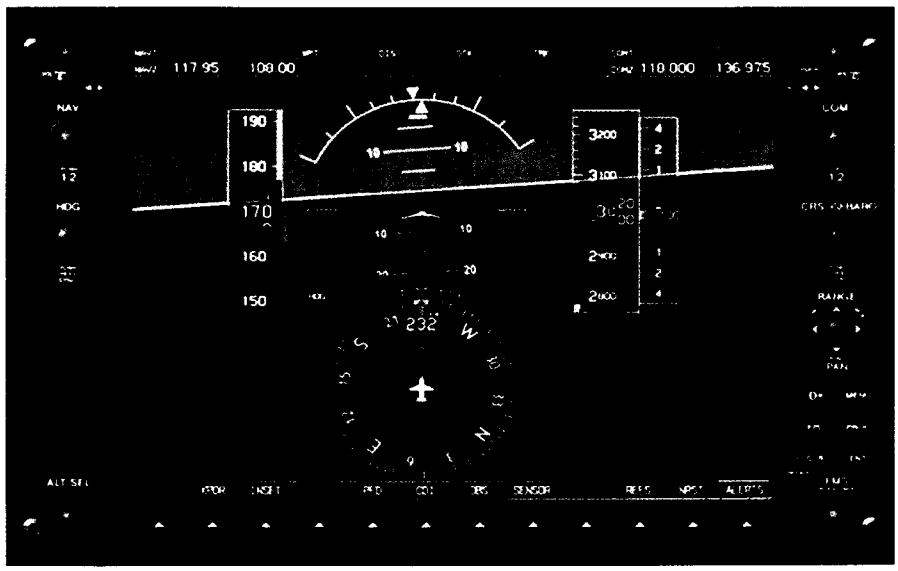
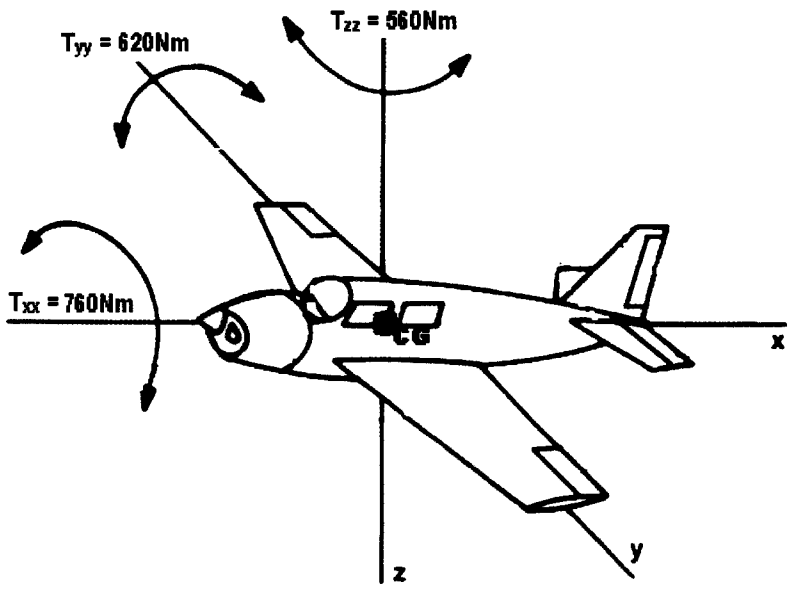


Figure S2b



* Wing Span = 12m, $CG_{aircraft}$ to CG_{tail} = 7m
* Assume the wing and horizontal & vertical stabilizers are of rectangular shapes

Figure S2c

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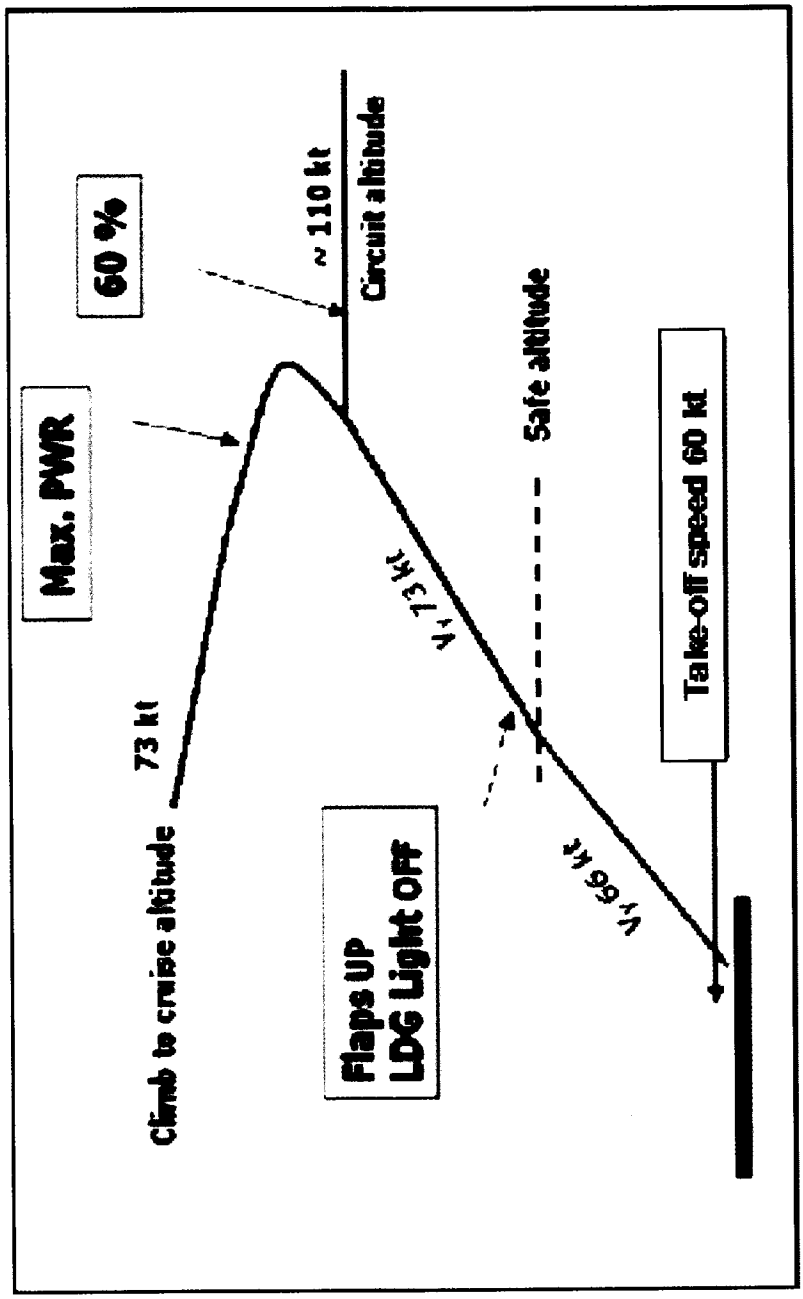

Figure S3