

2506/201
AIRCRAFT PROPELLER
SYSTEMS
Oct./Nov. 2021
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN AERONAUTICAL ENGINEERING
(AIRFRAME AND ENGINES OPTION)

MODULE II

AIRCRAFT PROPELLER SYSTEMS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments.

This paper consists of EIGHT questions.

Answer FIVE of the EIGHT questions in the answer booklet provided.

Maximum marks for each part of a question are as shown.

Candidates should answer the questions in English.

This paper consists of 3 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

1. (a) Discuss each of the components of a typical propeller electrical de-icer system. (15 marks)
- (b) Discuss the test that should be carried out on propeller electrical de-icer systems. (5 marks)
2. (a) With the aid of a labelled sketch, show a simplified aircraft propeller torque sensor system. (8 marks)
- (b) Explain the requirements and operation of a torque meter used to provide indication of the automatic feathering within the propeller system. (12 marks)
3. With reference to propeller service bulletins, discuss each of the following maintenance requirements:
 - (a) general accomplishment instructions; (4 marks)
 - (b) long-term storage of controllable pitch propellers; (8 marks)
 - (c) long-term storage of governor and accumulators. (8 marks)
4. Outline the typical propeller checks to be carried out using pre-flight or walk-around inspection. (20 marks)
5. With the aid of labelled sketches, discuss the forces that act on a propeller during each of the following:
 - (a) wind milling; (13 marks)
 - (b) reverse thrust. (7 marks)
6. (a) With the aid of a sketch, explain the propeller blade theory. (5 marks)
- (b) With the aid of labelled sketches, describe the construction and operation of counter weight hydromatic propellers. (15 marks)
7. (a) Outline the procedure for starting a typical turbo-propeller engine on the ground. (10 marks)
- (b) Discuss propeller synchronisation. (10 marks)

8. With the reference to JAR propeller regulations:

- (a) outline **six** propeller hazard effects; (6 marks)
- (b) discuss propeller blade flutter; (8 marks)
- (c) highlight the types of inspections done on a propeller blade during damage evaluation. (6 marks)

THIS IS THE LAST PRINTED PAGE.