

School of Aeronautics (Neemrana)

Question Paper For Internal Assessment Examination (Theory) - Old Scheme i.e 2012 Syllabus

Instructions For Students / Faculty

Mid Term I (Total 40 Marks, 1 Hr. & 30 Min, Syllabus From Beginning of The Session)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from each part i.e. Part A and B. There is a choice of two questions out of four in each part. Part A will be theoretical or derivation type (**Not More Than 70 Words For Question**). Part B will be fully numerically oriented questions (**Not More Than 70 Words For Question**), except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

Mid Term II (Total 50 Marks, 1 Hr. & 45 Min, Syllabus From Beginning of The Session)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and three questions from Part B. There is a choice of two questions out of four in part A and 3 questions out of 4 in Part B. Part A will be theoretical or derivation type (**Not More Than 70 Words For Question**). Part B will be fully numerically oriented questions (**Not More Than 70 Words For Question**), except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

Mid Term III (Total 60 Marks, 2 Hrs, Syllabus From Beginning of The Session)

Total number of questions to be given are 10, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and 4 questions from Part B. There is a choice of two questions out of four in part A and 4 questions out of 6 in Part B. Part A will be theoretical or derivation type (**Not More Than 70 Words For Question**). Part B will be fully numerically oriented questions (**Not More Than 70 Words For Question**), except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** Aircraft Materials, Aircraft System, Aircraft Rules & Regulation-I, Mechanics of Composite Materials, Aircraft Design, Aircraft Rules & Regulation-II, Avionics-I, Helicopter Theory, Maintenance of Airframe and System Design, Avionics-II, Airlines and Airport Management, Maintenance of Power Plant & Systems

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'B' OF QUESTION PAPER

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION

Question Paper & Student Details

Mid Term*	Mid Term 1	Date of Submission of QP	02/09/2019
Name of Faculty*	SUKUMAR DHANAPALAN	Date of Examination*	10/09/2019
Subject*	7AN6.3 – Maintenance of Airframe and S...	Course*	B.Tech (Aeronautical Enginee...
Batch	Combined Batches 10,11	Semest...	Semester : 7
Email Id of Faculty:*	sukumar.aero88@gmail.com	Phone Number of Faculty*	790 425 6314

Student Name		Student Reg No.	
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Part A

Question : 1*

Recall the uses and application of

- a) Longerons
- b) Stringers
- c) Formers

Lesson Plan* 6 Topic* Airframe Construction Source* Text Book

Question : 2*

How the following parts are utilized in the airframe construction, Explain them with a neat sketch

- a) Bulkhead
- b) Spars
- c) Ribs

Lesson Plan* 7 Topic* Airframe Construction Source* Text Book

Question : 3*

Find the Location and uses of the following parts in detail with the neat sketch

- a) Ailerons
- b) Elevators
- c) Rudders
- d) Elevons

Lesson Plan*

9

Topic*

Aircraft Control Surface

Source*

Text Book

Question : 4*

What is the role of the following parts and where it is located in the aircraft. Define them with neat sketch,

- a) Trimming and control tabs
- b) Leading and Trailing edge Flaps
- c) Tail plane
- d) Fins

Lesson Plan*

10,11

Topic*

Aircraft Control Surface

Source*

Text Book

Part B

Question : 1*

Illustrate the Truss type airframe construction with neat sketch.

Lesson Plan*

1

Topic*

Airframe Construction

Source*

Text Book

Question : 2*

Demonstrate the tubular type airframe construction with a proper sketch.

Lesson Plan*

2

Topic*

Airframe Construction

Source*

Text Book

Question : 3*

Explain with neat sketch about the semi-monocoque structure with its advantages & disadvantages.

Lesson Plan*

5

Topic*

Airframe Construction

Source*

Text Book

Question : 4*

Summarize the monocoques structure of airframe construction with neat diagram and its disadvantages over semi-monocoque structure.

Lesson Plan*

3,4

Topic*

Airframe Construction

Source*

Text Book

Question : 5

Lesson Plan

Topic

Source

Question : 6

Lesson Plan

Topic

Source

Upload Scanned Document In Case of Numerical or Diagram for any of the above question

Mention question number with relevant fig / numerical / equations. Max 150 KB

Choose files or drag here

I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.



Answer Sheet Details	
Mid Term	Mid Term 1
Name of Faculty	SUKUMAR DHANAPALAN
Subject	7AN6.3 - Maintenance of Airframe and System design (Old)
Date of Submission of QP	17/09/2019
Batch	Tenth (10)
Email Id of Faculty:	sukumar.aero88@gmail.com
Date of Examination	10/09/2019
Course	B.Tech (Aeronautical Engineering)
Semester	Semester : 7
Phone Number of Faculty	790-425-6314

Part A

Question : 1

Recall the uses and application of a) Longerons, b) Stringers & c) Formers.

Answer:

They resist bending and axial loads along with the skin.

They divide the skin into small panels and thereby increase its buckling and failure stresses.

They act with the skin in resisting axial loads caused by pressurization. In aircraft construction, a stringer is a thin strip of material to which the skin of the aircraft is fastened.

stringers are attached to formers (also called frames) and run in the longitudinal direction of the aircraft. They are primarily responsible for transferring the aerodynamic loads acting on the skin onto the frames and formers. The primary function here also is to transfer the bending loads acting on the wings onto the ribs and spar.

A former is a structural member of an aircraft fuselage, of which a typical fuselage has a series from the nose to the empennage, typically perpendicular to the longitudinal axis of the aircraft. The primary purpose of formers is to establish the shape of the fuselage and reduce the column length of stringers to prevent instability.

Formers are typically attached to longerons, which support the skin of the aircraft.

Question : 2

How the following parts are utilized in the airframe construction, Explain them with a neat sketch

a) Bulkhead, b) Spars, c) Ribs.

Answer:

The bulkheads provide shape for the fuselage. The skin of the fuselage to bear the structural load with bulkheads at each end and forming rings at intervals to maintain the skin shape. construction panels of aerodynamically-curved skin are riveted on top of an internal structure consisting of bulkheads, stringers and followers to absorb the bending forces.

Ribs are the structural crosspieces that combine with spars and stringers to make up the framework of the wing. They usually extend from the wing leading edge to the rear spar or to the trailing edge of the wing. The ribs give the wing its cambered shape and transmit the load from the skin and stringers to the spars.

Spars are the principal structural members of the wing. They correspond to the longerons of the fuselage. They run parallel to the lateral axis of the aircraft, from the fuselage toward the tip of the wing, and are usually attached to the fuselage by wing fittings, plain beams, or a truss.

Question : 3

Find the Location and uses of the following parts in detail with the neat sketch

a) Ailerons b) Elevators c) Rudders d) Elevons

Primary Control Surface

Axes of Rotation Type of Stability

Aileron Rolling Longitudinal Lateral

Elevator Pitching Lateral Longitudinal

Rudder Yawing Vertical / Normal Directional

Question : 4

What is the role of the following parts and where it is located in the aircraft. Define them with neat sketch,

a) Trimming and control tabs, b) Leading and Trailing edge Flaps, c) Tail plane, d) Fins

Flaps are the most common high-lift devices used on aircraft. These surfaces, which are attached to the trailing edge of the wing, increase both lift and induced drag for any given AOA. Flaps allow a compromise between high cruising speed and low landing speed, because they may be extended when needed, and retracted into the wing's structure when not needed. There are four common types of flaps: plain, split, slotted, and Fowler flaps.

Found on many gliders and some aircraft, high drag devices called spoilers are deployed from the wings to spoil the smooth airflow, reducing lift and increasing drag. On gliders, spoilers are most often used to control rate of descent for accurate landings.

The most common installation on small aircraft is a single trim tab attached to the trailing edge of the elevator. Most trim tabs are manually operated by a small, vertically mounted control wheel.

Part B**Question : 1**

Illustrate the Truss type airframe construction with neat sketch.

Answer:

Most early aircraft used this technique with wood and wire trusses and this type of structure is still in use in many lightweight aircraft using welded steel tube trusses. The truss type fuselage frame is assembled with members forming a rigid frame e.g. beams, bar, tube etc...

Primary members of the truss are 4 longerons. There are two types of truss structure.

- PRATT TRUSS

Early days

Wooden or metal structure

Great weight

Difficult to streamline

Box with tubular longerons + vertical members

- WARREN TRUSS

Longerons + only Diagonal Members

Force transfer to every others structure

Capable to carry tension + compression

Reduce amount of webs work

More space , strength , rigidity

Better streamline

Question : 2

Demonstrate the tubular type airframe construction with a proper sketch.

To summarize, in semi-monocoque fuselages, the strong, heavy longerons hold the bulkheads and formers, and these, in turn, hold the stringers, braces, web members, etc. All are designed to be attached together and to the skin to achieve the full strength benefits of semi-monocoque design. It is important to recognize that the metal skin or covering carries part of the load. The fuselage skin thickness can vary with the load carried and the stresses sustained at a particular location.

The advantages of the semi-monocoque fuselage are many. The bulkheads, frames, stringers, and longerons facilitate the design and construction of a streamlined fuselage that is both rigid and strong. Spreading loads among these structures and the skin means no single piece is failure critical. This means that a semi-monocoque fuselage, because of its stressed-skin construction, may withstand considerable damage and still be strong enough to hold together.

Fuselages are generally constructed in two or more sections. On small aircraft, they are generally made in two or three sections, while larger aircraft may be made up of as many as six sections or more before being assembled.

Question : 3

Explain with neat sketch about the semi-monocoque structure with its advantages & disadvantages.

Answer:

To overcome the strength/weight problem of monocoque construction, a modification called semi-monocoque construction was developed. It also consists of frame assemblies, bulkheads, and formers as used in the monocoque design but, additionally, the skin is reinforced by longitudinal members called longerons. Longerons usually extend across several frame members and help the skin support primary bending loads. They are typically made of aluminum alloy either of a single piece or a built-up construction.

Stringers are also used in the semimonocoque fuselage. These longitudinal members are typically more numerous and lighter in weight than the longerons. They come in a variety of shapes and are usually made from single piece aluminum alloy extrusions or formed aluminum. Stringers have some rigidity but are chiefly used for giving shape and for attachment of the skin. Stringers and longerons together prevent tension and compression from bending the fuselage.

Question : 4

Summarize the monocoques structure of airframe construction with neat diagram and its disadvantages over semi-monocoque structure.

Answer:

The true monocoque construction uses formers, frame assemblies, and bulkheads to give shape to the fuselage. The heaviest of these structural members are located at intervals to carry concentrated loads and at points where fittings are used to attach other units such as wings, power plants, and stabilizers. Since no other bracing members are present, the skin must carry the primary stresses and keep the fuselage rigid. Thus, the biggest problem involved in monocoque construction is maintaining enough strength while keeping the weight within allowable limits.

Question : 5**Question : 6**

Upload Scanned Document In Case of Numerical or Diagram for any of the above question

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I have scrutinized the answer sheet. There is no spelling mistake or any type of irrelevant answers.



The message has been sent from 157.47.185.74 (India) at 2019-09-17 23:16:16 on Chrome 76.0.3809.132

Entry ID: 11

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Form Host:

<http://www.123formbuilder.com/sfnew2.php?redirect=true&s=5017221&loadsubm=x5d80e27277a406.92124691>

School of Aeronautics (Neemrana)

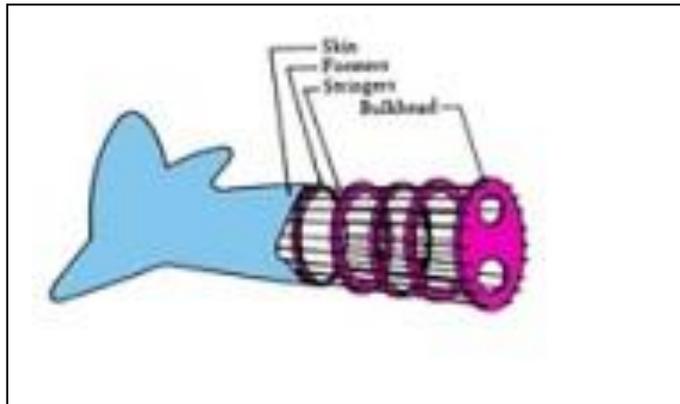
Answer Sheet For Internal Assessment Examination (Theory) - Diagram Sheet

Faculties preparing Answer Sheet for various examinations, need to draw or insert diagrams as per requirement of questions in the below format and upload the same in upload documents column of the answer sheet.

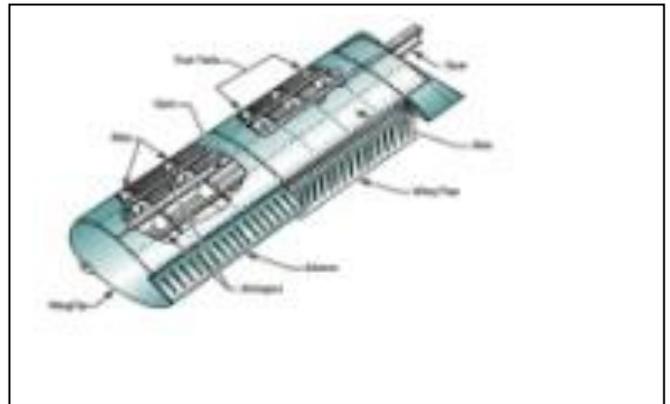
Answer Sheet Details

Mid Term *	Mid Term-1	Date of Submission of QP	10/4/2019
Name of Faculty *	SUKUMAR DHANAPALAN	Date of Examination *	9/10/2019
Subject *	7AN6.3- MAINTENANCE OF AIRFRAME	Course*	B.Tech Aeronautical
Batch	Combined Batch 10. 11	Semester *	Seventh Semester
Email Id of Faculty:*	sukumar.aero88@gmail.com	Phone Number of Faculty*	7904256314
Student Name		Student Reg No.	

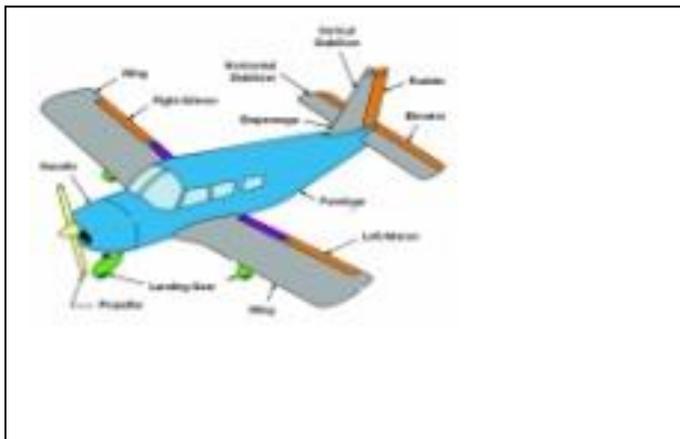
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Part No. _A_, Question Number _2_ .



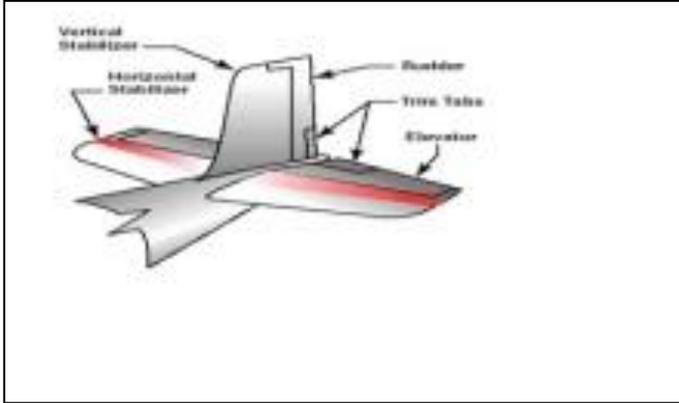
Part No. _A_, Question Number _3_ .



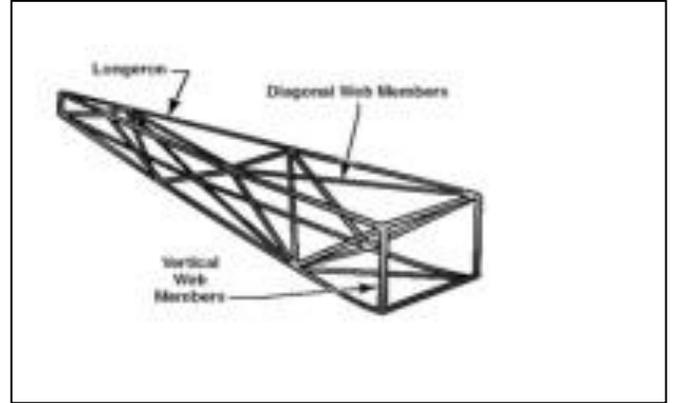
Part No. _A_, Question Number _4_ .



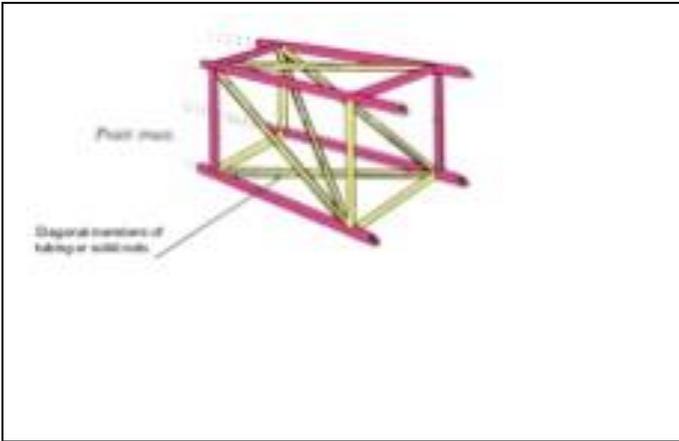
Part No. _A_, Question Number _4_ .



Part No. _B_, Question Number _1_ .



Part No. _B_, Question Number _1_ .



Part No. _B_, Question Number _4_ .

