C–5865

Sub. Code
11813

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Aeronautical Science

WORKSHOP PRACTICES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. When arranging tools in a workshop, what should be prioritized?

   (a) Random placement for easy access

   (b) Organized storage to minimize hazard

   (c) Cluttered setup for aesthetic appeal

   (d) Keeping tools scattered on the floor

2. Which extinguishing agent is suitable for electrical fires?

   (a) Water

   (b) Foam

   (c) Carbon dioxide

   (d) Dry powder

3. What is a common power tool used for drilling holes?

(a) Hammer

(b) Pliers

(c) Drill

(d) Screwdriver

4. Standards of workmanship ensure:

(a) Consistent quality and precision in work

(b) Random and careless handling of tools

(c) Ignoring safety measures

(d) Unregulated use of workshop materials

5. Which type of micrometer is specifically designed for measuring the inside diameter of a hole?

(a) External micrometer

(b) Depth micrometer

(c) Tube micrometer

(d) Vernier calipers

6. _____ is a precision instrument used for measuring small linear distances or deflections with high sensitivity.

(a) Dial Gauge

(b) Screw gauge

(c) Go No Go gauge

(d) Tube micrometer

7. Which type of thread gauge is used to check the internal threads of a component?

(a) Ring thread gauge

(b) Plug thread gauge

(c) Go gauge

(d) Not go gauge

8. Which type of fit is characterized by a small amount of interference between mating parts?

(a) Clearance fit

(b) Transition fit

(c) Interference fit

(d) Loose fit

9. Which milling machine type is known for its versatility, as it can perform both horizontal and vertical milling operations?

(a) Vertical milling machine

(b) Horizontal milling machine

(c) Universal milling machine

(d) CNC milling machine

10. Which part of a lathe machine is responsible for holding and rotating the workpiece?

(a) Chuck

(b) Tailstock

(c) Carriage

(d) Headstock

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the remedial actions to be taken when the Toxic chemical spill happens?

Or

(b) How do you organize Hardware and Tools?

12. (a) Explain taps and pliers in aircraft maintenances.

Or

(b) Write the list of different types of hand tools.

13. (a) List out the types of inside caliper.

Or

(b) Write short notes on Optical Flat.

14. (a) Explain various types of gauges.

Or

(b) Discuss about the Designation of Tolerance.

15. (a) What type and shapes of Cutting Tool are used for various Metals and Materials in Lathe?

Or

(b) List out the speed changing conditions for lathe.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain the workshop safety procedures to be followed for below:

(i) Chemicals

(ii) Oxygen

Or

(b) List out and discuss about the methods are recommended for using files.

17. (a) Discuss about the various types of pliers.

Or

(b) How will you Enhance durability, Sensitivity and Visibility of Dial Test Indicators?

18. (a) Explain the construction and working of outside micrometer with a sketch.

Or

(b) Explain various types of punches with a neat sketch.

19. (a) Define following:

(i) Allowance

(ii) Limit

(iii) Clearance

(iv) Tolerance

Or

(b) Describe the procedure for proper handling of Roller Bearings.

20. (a) Explain various operations performed in lathe.

Or

(b) What are the principal safety rules that the Grinding Machine operator must follow?

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C–5866

Sub. Code
11815

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Aeronautical Science

AVIATION MATHEMATICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. The eigen values of the matrix $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ are

   (a) 1, 6 (b) –1, 6

   (c) 1, 3 (d) 2, 3

2. The system of equations $AX = B$ is consistent if and only if,

   (a) $R(A) = R(A, B)$

   (b) $R(A) \neq R(A, B)$

   (c) $R(A) < R(A, B)$

   (d) $R(A) > R(A, B)$

3. The direction ratios of $A(1,8,4)$ and $B(4,5,-2)$ are

   (a) 5, 13, 2 (b) 3, –3, –6

   (c) 4, 40, –8 (d) 5, –13, –2

4. If a line makes an agles a,b,c with the co-ordinate axes, then $\sin^2 a + \sin^2 b + \sin^2 c =$

(a) 1 (b) 0

(c) 2 (d) –1

5. Equation of the envelope of the family $A\alpha^2 + B\alpha + C = 0$ is

(a) $\dfrac{-B \pm \sqrt{B^2 - 4AC}}{2A}$ (b) $\sqrt{B^2 - 4AC}$

(c) $B^2 - 4AC = 0$ (d) $-B \pm \sqrt{B^2 - 4AC}$

6. The equation of the circle of curvature is

(a) $x^2 + y^2 = \rho^2$

(b) $(x - \overline{x})^2 + (y - \overline{y})^2 = r^2$

(c) $(x - \overline{x})^2 + (y - \overline{y})^2 = \rho^2$

(d) $x^2 - y^2 = \rho^2$

7. $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} + z\dfrac{\partial u}{\partial z} = ?$, where u is a homogeneous equation of degree 'n'

(a) u (b) $2u$

(c) nu (d) 0

8. If u and v are functions of 2 independent variables x and y then $J\left(\dfrac{u, v}{x, y}\right)$ is

(a) $\begin{vmatrix} \dfrac{\partial u}{\partial x} & \dfrac{\partial u}{\partial y} \\ \dfrac{\partial v}{\partial x} & \dfrac{\partial \mathrm{v}}{\partial \mathrm{y}} \end{vmatrix}$ (b) $\begin{vmatrix} \dfrac{\partial u}{\partial x} & \dfrac{\partial v}{\partial x} \\ \dfrac{\partial u}{\partial y} & \dfrac{\partial \mathrm{v}}{\partial \mathrm{y}} \end{vmatrix}$

(c) $\begin{vmatrix} \dfrac{\partial u}{\partial y} & \dfrac{\partial u}{\partial x} \\ \dfrac{\partial v}{\partial y} & \dfrac{\partial \mathrm{v}}{\partial \mathrm{y}} \end{vmatrix}$ (d) $\begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix}$

9. A network

(a) must be drawn at the commencement of the project

(b) must be used for all briefings on the project

(c) must be periodically updated and revised

(d) none of the above

10. Activities with zero slack

(a) can be delayed

(b) must be completed first

(c) lie on a critical path

(d) have no predecessors

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Find the eigen vectors of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.

Or

(b) Show that the vectors $X_1 : (1,1,2); X_2 : (1,2,5)$ and $X_3 : (5,3,4)$ are linearly dependent.

12. (a) Find the length and equations of the shortest distance between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$.

Or

(b) Find the equation of the sphere having the circle $x^2 + y^2 + z^2 + 10y - 4z - 8 = 0$, $x + y + z = 3$ as a great circle.

13. (a) Find the equation of the circle of curvature of the parabola $y^2 = 12x$ at the point (3, 6).

Or

(b) Find the evolute of the parabola $x^2 = 4ay$.

14. (a) Find the maximum value of the function $f = x^3y^2(12 - x - y)$.

Or

(b) Verify Euler's theorem for the function $u = x^3 + y^3 + z^3 + 3xyz$.

15. (a) A project schedule has the following characteristics

Activity	1-2	1-3	2-4	3-4	3-5	4-9
Duration	4	1	1	1	6	5
Activity	5-6	5-7	6-8	7-8	8-10	9-10
Duration	4	8	1	2	5	7

Construct the network and determine the critical path of the project.

Or

(b) Discuss in detail the procedure to solve PERT and CPM techniques.

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$.

Or

(b) Test for the consistency of the following system of equations and solve them if consistent.

$3x + y + z = 8; -x + y - 2z = -5; x + y + z = 6; -2x + 2y - 3z = -7$

17. (a) Find the equation of the sphere that passes through the circle $x^2 + y^2 + z^2 + 2x + 3y + z - 2 = 0$, $2x - y - 3z - 1 = 0$ cuts orthogonally the sphere $x^2 + y^2 + z^2 - 3x + y - 2 = 0$.

Or

(b) Find the equation of the plane passing through the point (1, 2, –1) and $\perp^r$ to the planes $x + y - 2z = 5$ and $3x - y + 4z = 12$.

18. (a) Find the equation of the circle of curvature of the curve $xy = 12$ at the point (3, 4)

Or

(b) Find the evolute of the parabola $y^2 = 4ax$, considering it as the envelope of normals.

19. (a) Expand $e^x \cos y$ in powers of x and y as for as the terms of the third degree at (0, 0).

Or

(b) If $u = f(x, y)$, where $x = r\cos\theta$ and $y = r\sin\theta$, prove that $\left(\frac{\partial u}{\partial x}\right)^2 + \left(\frac{\partial u}{\partial y}\right)^2 = \left(\frac{\partial u}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial u}{\partial \theta}\right)^2$.

20. (a) A project consisting of seven activities is given below.

Activities	Estimated Duration		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

(i) Draw the network diagram of activities.

(ii) Find the expected duration and variance of each activity.

(iii) What is the expected project length.

Or

(b) Determine the critical path, critical activities and the project completion time for the following.

Activity	Predecessor	Duration (weeks)
A	–	3
B	A	5
C	A	7
D	B	10
E	C	5
F	D, E	4

C–5867

Sub. Code
11823

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Aeronautical Science

AIRCRAFT BASICS ELECTRICITY & ELECTRONICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Colour bands for 67KΩ resistors will be

   (a) Blue, violet, orange

   (b) Blue, green, orange

   (c) Blue, violet, red

   (d) Violet, blue, red

2. Among which of the following is commonly referred to as the insulating layer between capacitor plates?

   (a) Conductive plate

   (b) Open plate

   (c) Dielectric

   (d) Electrolyte

3. Parallel grouping of cell is done in battery is to

(a) Increase the current capacity

(b) Increase the internal resistance

(c) Increase the output voltage

(d) Decrease the output voltage

4. Battery charger acts like a

(a) Converter

(b) Rectifier

(c) Chopper

(d) inverter

5. Two alternators are running in parallel, if the field of one of the alternators is adjusted it will

(a) change its power factor

(b) change its frequency

(c) reduce its speed

(d) change its load

6. In DC motor, which of the following part can sustain the maximum temperature rise?

(a) Field winding

(b) Commutator

(c) Slip rings

(d) Armature winding

7. Which electrical component on a small piston aircraft is completely isolated from the regular electrical system?

(a) Standby battery

(b) Magneto

(c) Pitot heat

(d) Flaps

8. Electrical cable used to connect radio and high frequency equipment is

(a) Co-axial cable

(b) Single strand cable

(c) Multistrands cable

(d) None of the above

9. What is the function of an Anti-lock braking system?

(a) Used for car parking

(b) To maintain tractive force

(c) Programming the system

(d) To drive the car

10. What color is used in EICAS for certain warning messages?

(a) Red

(b) Magneta

(c) Green

(d) Amber

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write the application of CRO and function generator?

Or

(b) Write the operation of Field effect transistor and configuration.

12. (a) Explain constant current charging.

Or

(b) Write the working of battery circuit.

13. (a) Explain operation of current limiter of generator.

Or

(b) Explain the working principle of DC motor.

14. (a) Draw the circuit diagram of bridge rectifier and explain.

Or

(b) Discuss about bonding and shielding.

15. (a) Describe the difference between landing and taxi light circuit.

Or

(b) Explain aircraft light and warning indicating with uses.

Part C

(5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Briefly explain about Transistor and its various configurations (CB, CE, CC).

Or

(b) Draw block diagram of CRO and application of CRO.

17. (a) Explain construction of lead acid battery and its chemical actions.

Or

(b) How the ground power circuit help the batteries in aircraft?

18. (a) Write in detail different types of generator with block diagram.

Or

(b) What is the purpose of load sharing in the generator? And how its help the distribution.

19. (a) Explain brief about parallel and split bus bar system.

Or

(b) Write about characteristics of aircraft electrical wire and uses.

20. (a) Write brief note on Antiskid brake system.

Or

(b) Write short note on landing, taxi, anti-collision, Navigation lights in aircraft.

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C–5868

Sub. Code
11825

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Aeronautical Science

APPLIED MECHANICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. If a number of forces are acting simultaneously on a particle, then the resultant of these forces will have the same effect as produced by the all the forces. This is known as

   (a) Principle of physical independence of forces

   (b) Principle of transmissibility of forces

   (c) Principle of resolution of forces

   (d) None of the above

2. In order to determine the effects of a force acting on a body, we must know

   (a) Its magnitude and direction of the line along which it acts

   (b) Its nature (whether push or pull)

   (c) Point through which it acts on the body

   (d) All of the above

3. The path of a projectile is not a parabola.

(a) True (b) False

4. The maximum displacement of a body moving with simple harmonic motion from its mean position is called

(a) Oscillation (b) Amplitude

(c) Beat (d) None of them

5. The force of friction between two bodies in contact

(a) Depends upon the area of their contact

(b) Depends upon the relative velocity between them

(c) Is always normal to the surface of their contact

(d) All of the above

6. The efficiency of a screw jack may be increased by

(a) Increasing its pitch

(b) Decreasing its pitch

(c) Increasing the load to be lifted

(d) Decreasing the load to be lifted.

7. A framed structure of a triangular shape is

(a) Perfect (b) Imperfect

(c) Deficient (d) Redundant

8. In a cantilever truss, it is very essential to find out the reactions before analyzing it.

(a) Agree (b) Disagree

9. Modulus of elasticity is the ratio of

(a) Stress to strain

(b) Stress to original length

(c) Deformation to original length

(d) All of these

10. The design of a thin cylindrical shell is based on

(a) Internal pressure

(b) Diameter of shell

(c) Longitudinal stress

(d) All of these

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the various characteristics of a force?

Or

(b) Distinguish clearly between resolution of forces and composition of forces.

12. (a) What is projectile? Give an example of a projectile.

Or

(b) Explain the meaning of S.H.M. and give its one example.

13. (a) Define coefficient of friction and limiting friction.

Or

(b) What is a screw jack? Explain the principle, on which it works.

14. (a) What is a frame? Discuss its classification.

Or

(b) What is a cantilever truss? How will you find out its reaction?

15. (a) Define stress, strain and elasticity. Derive a relation between stress and strain of an elastic body.

Or

(b) What is the relation between slope, deflection and radius of curvature of a simply supported beam?

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) The following forces act at a point :

(i) 20 N inclined at 30° towards North of East,

(ii) 25 N towards North,

(iii) 30 N towards North West, and

(iv) 35 N inclined at 40° towards South of West. Find the magnitude and direction of the resultant force.

Or

(b) What is lever? Distinguish clearly between a simple lever and compound lever.

17. (a) Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the centre of gravity of the section.

Or

(b) Write short notes :

(i) Curvilinear translation

(ii) Free vibration and forced vibration

18. (a) 1A ladder 5 meters long rests on a horizontal ground and leans against a smooth vertical wall at an angle 70° with the horizontal. The weight of the ladder is 900 N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750N stands on a rung 1.5 metre from the bottom of the ladder. Calculate the coefficient of friction between the ladder and the floor.

Or

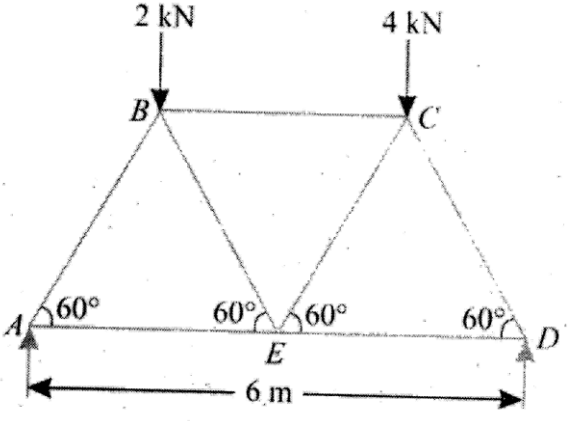
(b) Write short notes on :

(i) Laws of friction.

(ii) Angle of friction

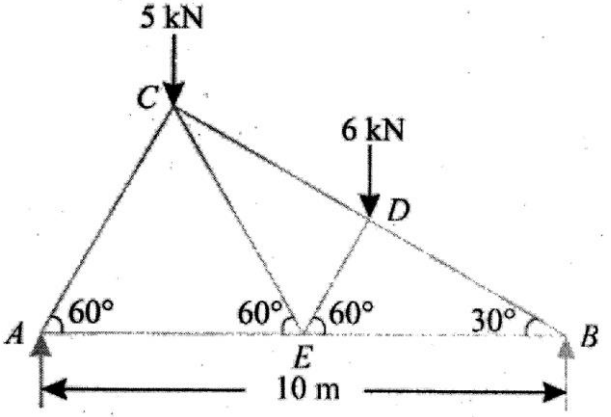
(iii) Wedge friction

19. (a) A Warren girder consisting of seven members each of 3m length freely supported at its end points. The girder is loaded at B and C as shown. Find the forces in all the members of the girder, indicating whether the force is compressive or tensile.



Or

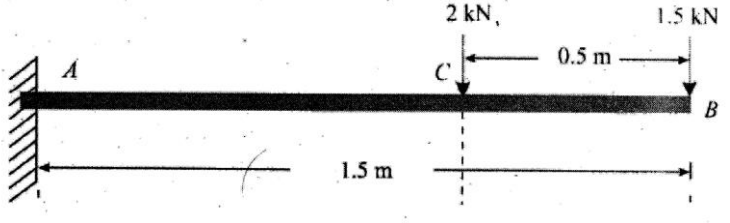
(b) A truss of span 10 meters is loaded. Find the forces in all the members of the truss.



20. (a) A stream boiler of 800 mm diameter is made up of 10 mm thick plates. If the boiler is subjected to an internal pressure of 2.5 MPa, find the circumferential and longitudinal stresses induced in the boiler plates.

Or

(b) Draw shear force and bending moment diagrams for a cantilever beam of span 1.5 m carrying point loads as shown in Fig.



C–5869

Sub. Code
11833

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Aeronautical Science

BASIC AERODYNAMICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Which layer of the atmosphere contains the ozone layer?
   (a) Troposphere (b) Stratosphere
   (c) Mesosphere (d) Thermosphere

2. What is the standard density of air at sea level in ISA?
   (a) 1.225 kg/m^3 (b) 1.250 kg/m^3
   (c) 1.150 kg/m^3 (d) 1.300 kg/m^3

3. The point where the chord line of the aerofoil meets the leading edge is called
   (a) Stagnation point (b) Nose point
   (c) Apex (d) Tip

4. How does wash-out affect lift distribution along the wing?
   (a) It increases life near the wing tips
   (b) It decreases lift near the wing tips
   (c) It creates uniform lift across the wing
   (d) It eliminates lift at the wing root

5. Which flight control surface is used to increase lift during takeoff and landing?
   (a) Elevators (b) Rudder
   (c) Ailerons (d) Flaps

6. Why are vertical fins important in an aircraft?
   (a) To increase lift during take-off
   (b) To provide yaw stability
   (c) to reduce roll motion
   (d) To generate Thrust

7. Which of the following conditions indicates neutral dynamic stability?
   (a) Oscillations that decay overtime and eventually stop
   (b) The aircraft never oscillates after being disturbed
   (c) Oscillations that neither decay nor grow in amplitude
   (d) Oscillations that continuously increase in amplitude over time

8. Which of the following factors primarily influences an aircraft's directional stability?
   (a) The vertical tail surface area
   (b) Wing loading
   (c) The location of the center of gravity
   (d) The length of the fuselage

9. What happens to the pressure and temperature across a normal shock wave?
   (a) Pressure decreases, temperature increases
   (b) Pressure increases, temperature decreases
   (c) Pressure and temperature both increases
   (d) Pressure and temperature both decreases

10. In an aircraft is flying at a mach number slightly below its critical Mach number. What is most likely happening?
   (a) The aircraft is experiencing supersonic airflow over some parts of the aircraft
   (b) The aircraft is in a subsonic flow regime
   (c) The aircraft is experiencing shock waves
   (d) The aircraft is in a transonic flow regime

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe about the pressure of atmosphere.

Or

(b) What is the ozone layer? Explain its significance and the impact of ozone depletion.

12. (a) Differentiate laminar and turbulent flow around a body.

Or

(b) Write short notes about generation of lift and drag?

13. (a) How does the rudder control the yaw movement of an aircraft?

Or

(b) Describe the role of spoilers in aircraft.

14. (a) Explain about static stability.

Or

(b) Write short notes about spiral stability.

15. (a) Discuss the effects of compressibility on fluid flow at high speeds.

Or

(b) Explain the significance of Mach number in high speed aerodynamics.

Part C

(5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Describe the composition and structure of the Earth's atmosphere. How does the atmospheric composition influence aerodynamics at different altitudes?

Or

(b) Explain the concept of the International Standard Atmosphere (ISA). What are its assumptions and why it is important in aerodynamics?

17. (a) Discuss the aerodynamic characteristics of an aerofoil. Explain the importance of angle of attack and how it influences lift and drag.

Or

(b) Describe the four fundamental forces acting on an aircraft during flight. Explain how these forces interact to maintain steady – level Flight.

18. (a) Explain the operation and effect of roll control in aircraft.

Or

(b) Explain the terms

(i) Climbing

(ii) Gliding.

19. (a) Discuss in detail about longitudinal stability.

Or

(b) Explain the concept of the "Dutch roll" oscillation. What factors contribute to this type of instability and how can it be mitigated?

20. (a) Explain the phenomenon of shock waves and their formation in high-speed flows.

Or

(b) Differentiate between subsonic, transonic and supersonic flow regimes.

C–5870	Sub. Code 11834

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Aeronautical Science

AIRCRAFT CONSTRUCTIONS AND SYSTEMS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Which of the following forces acts perpendicular to the wing surface?

   (a) Lift (b) Weight

   (c) Thrust (d) Drag

2. What is the primary goal of a fail-safe design in aircraft structures?

   (a) To prevent any failure from occurring

   (b) To ensure the aircraft can still fly safely after a failure

   (c) To reduce the weight of the aircraft structure

   (d) To increase the payload capacity of the aircraft

3. What is the primary function of ailerons?

   (a) Pitch control (b) Roll control

   (c) Yaw control (d) Speed control

4. What is the primary advantage of fly-by-wire systems?

(a) Mechanical simplicity

(b) Increased pilot workload

(c) Improved safety and reliability

(d) Reduced system cost

5. What is the primary function of the landing gear system?

(a) To provide stability during flight

(b) To absorb shock during landing

(c) To support the aircraft on the ground

(d) All of the above

6. Which type of retraction system is commonly used in large commercial aircraft?

(a) Hydraulic retraction

(b) Pneumatic retraction system

(c) Electrical retraction system

(d) Manual retraction system

7. What is the primary purpose of an aircraft hydraulic system?

(a) To generate electric power

(b) To provide cooling for engines

(c) To transmit pressure for system operation

(d) To provide fuel for engines

8. Which component is responsible for generating pressure?

(a) Reservoir (b) Pump

(c) Filter (d) Accumulator

9. What is the primary function of an aircraft fuel system?
   (a) To generate electrical power
   (b) To provide hydraulic pressure
   (c) To supply fuel to the engines
   (d) To cool engine oil

10. Which component is responsible for pumping fuel from the tanks to the engines?
   (a) Fuel pump (b) Fuel filter
   (c) Fuel injector (d) Fuel gauge

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Define the forces acting on aircraft.

Or

(b) Write a short note on Honeycomb construction.

12. (a) Write a short notes about power assisted control system.

Or

(b) Write a short note on balancing of control surfaces.

13. (a) Describe about the types of landing gear.

Or

(b) Write a short note on parts of landing gear.

14. (a) Describe about the properties of hydraulic fluid.

Or

(b) Write the advantages of aircraft hydraulic systems.

15. (a) Describe properties and characteristics of aviation fuel.

Or

(b) Write a short note on defueling operation.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain about the sandwich construction in detail.

Or

(b) Explain in detail about the Zoning nomenclature.

17. (a) Discuss in detail about the Rigging of flight control and symmetry check with neat diagram.

Or

(b) Discuss about the construction features of primary and secondary control surfaces with necessary diagrams.

18. (a) Explain the working principle of nose wheel steering system with neat diagram.

Or

(b) With the help of neat sketch explain in detail about retraction system.

19. (a) Discuss in detail about types of hydraulic fluid used in aircraft.

Or

(b) Explain about the contamination of hydraulic fluid and system layout in detail.

20. (a) Discuss about Gravity feed system and pressure feed system in detail.

Or

(b) Explain twin engine and multi engine fuel system with neat diagram.

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C–5871

Sub. Code
11836

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Aeronautical Science

FLUID MECHANICS AND HYDRAULIC MACHINES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. The mass per unit volume of a liquid at standard temperature and pressure is called

   (a) specific weight

   (b) specific gravity

   (c) mass density

   (d) none of the above

2. The ratio of specific weight of a liquid to the specific weight of pure water is known as

   (a) density of pure water

   (b) density of liquid

   (c) specific gravity of water

   (d) specific gravity of liquid

3. The centre of pressure acts _____ the centre of gravity of the immersed surface.

(a) at (b) above

(c) below (d) can't say

4. The total pressure on a vertically immersed surface is

(a) wA

(b) wx

(c) wAx

(d) none of these

5. A flow in which the velocities of liquid particles at all sections of the pipe are equal is called

(a) uniform flow

(b) streamline flow

(c) steady flow

(d) compressible flow

6. A flow in which each liquid particle has a definite path and the paths of individual particles do not cross each other is called

(a) streamline flow

(b) irrotational flow

(c) laminar flow

(d) both (a) and (c)

7. What are the two main types of losses that occur in fluid flow?

(a) Major losses and minor losses

(b) Frictional losses and pressure losses

(c) Velocity losses and pressure losses

(d) Potential losses and kinetic losses

8. What is the primary cause of major losses in fluid flow?

(a) Friction between the fluid and the pipe wall

(b) Changes in the pipe diameter or direction

(c) Obstacles or blockages in the pipe

(d) All of the above

9. What is the primary function of a turbine?

(a) To convert mechanical energy into electrical energy

(b) To convert electrical energy into mechanical energy

(c) To convert thermal energy into mechanical energy

(d) To convert mechanical energy into thermal energy

10. What is the primary source of energy for a hydroelectric power plant?

(a) Fossil fuels

(b) Nuclear energy

(c) Solar energy

(d) Kinetic energy of water

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) What is manometer? Write about type with suitable sketch.

Or

(b) Calculate the density, specific weight and weight of one liter of petrol of specific gravity = 0.7.

12. (a) Find the volume of the water displaced and position of centre of buoyancy for a wooden block of width 2.5 m and of depth 1.5 m. When it floats horizontally in water [density of wood = 650 kg/m^3, length = 6 m].

Or

(b) Explain stable, unstable, neutral equilibrium for floating body.

13. (a) Explain about orifice meter with suitable sketch and write the equations to find the discharge through orifice.

Or

(b) Write in detail about the equations of motions.

14. (a) Short notes on Reciprocating pump.

Or

(b) Write down the classification of turbines.

15. (a) Explain about Hydraulic lift with sketch.

Or

(b) Write notes on Hydraulic Ram (with diagram).

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Write short on;

(i) Absolute and gauge pressure,

(ii) Simple manometer and differential manometer.

Or

(b) A hydraulic press has a ram of 30 cm diameter and a plunger of 4.5 cm diameter. Find the weight lifted by the hydraulic press when the force applied at the plunger is 500 N.

17. (a) Write short notes on.

(i) Steady flow and un-steady flow,

(ii) Uniform and non-uniform flow,

(iii) Compressible and incompressible flow,

Or

(b) Determine the total pressure on a circular plate of diameter 1.5 m which is placed vertically in water in such a way that the centre of the plate is 3 m below the free surface of water. Find the position of centre of pressure also.

18. (a) What is Euler's equation of motion? How will you obtain Bernoullis equation from it?

Or

(b) What do you understand by total energy line, hydraulic gradient line, pipes in series, pipes in parallel and equivalent pipe?

19. (a) Derive an expression for Force exerted by a jet of water on Hinged plate.

Or

(b) Explain in detail about hydro Electric power plant.

20. (a) Explain with neat sketch different types of hydraulic cylinder.

Or

(b) What is a difference between a fluid coupling and fluid torque converter? Explain the torque converter with a sketch.

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C–5872	Sub. Code 11843

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Aeronautical Science

AIRCRAFT INSTRUMENTS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is standard atmospheric pressure
   (a) 1.0312 bar (b) 10132 bar
   (c) 0.1325 bar (d) 10.312 bar

2. Barometer used to measure
   (a) Total pressure
   (b) Pitot pressure
   (c) Static pressure
   (d) Atmospheric pressure

3. Altimeter is a part of basic T instrument layout
   (a) True (b) False

4. What is the full form of IAS?
   (a) Implied Air Speed
   (b) Indicated Air Speed
   (c) Incident Air Speed
   (d) Immediate Speed

5. What does attitude indicator display

(a) Aircrafts relation to the Horizon

(b) Aircraft relation to the ground

(c) Aircraft relation to the wind flow

(d) Aircraft relation to the atmospheric pressure

6. True Air speed shows air speed in

(a) Miles per hour

(b) Knots

(c) Nautical miles

(d) Kilometre per hour

7. Which type of pressure cage is most commonly used in aircraft to find pressure

(a) bourdon tube (b) diaphragm cage

(c) capsule cage (d) bellows cage

8. In larger aircraft fuel tanks or also present in the

(a) Tail (b) Fuselage

(c) Nose (d) Rudder

9. The compassion instrument shows the aircraft heading related to the magnetic ————————.

(a) West (b) North

(c) South (d) East

10. In a standard compass the magnetic system is immersed in a transparent liquid the purpose of the liquid is to ————————

(a) Increase sensitivity increases aperiodicity

(b) Increase sensitivity decrease aperiodicity

(c) Increase sensitivity at high latitude lubricate bearing

(d) Increase sensitivity reduce liquid swirl

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is the significance of using colours on instrument dial of ASI?

Or

(b) What are the layers of ISA and state its assumptions.

12. (a) Sketch Pitot static tube and explain its working principle.

Or

(b) Explain the construction, principle and its operation of Vertical Speed Indicator.

13. (a) Explain the construction and operation of Turn and Slip Indicator.

Or

(b) Explain the principle of gyroscope.

14. (a) Explain the operation of capacitance type fuel indicating system.

Or

(b) Describe the construction of a temperature-sensing element.

15. (a) Write about Magnetic Variation and Deviation.

Or

(b) What are the methods for Calibration of DR Compass?

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Briefly explain about grouping of aircraft instrument and its layout in cockpit of aircraft.

Or

(b) Briefly explain the working principle of Barometer. State the advantages and disadvantages of Barometer.

17. (a) Explain the construction and working principle of Air Speed Indicator.

Or

(b) Explain the construction and working principle of Altimeter.

18. (a) Explain the principle and operation of Directional Indicator.

Or

(b) What methods are adopted for driving the rotors of gyroscopic flight instruments?

19. (a) Describe the operation of capacitance type fuel quantity indication system.

Or

(b) Explain the principle and operation of Torque Pressure Indicator.

20. (a) Explain the operating principles of Direct Reading Compass.

Or

(b) Explain the operating principles of Remote Reading Compass.

C–5874

Sub. Code
11846

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Aeronautical Science

AERO ENGINEERING THERMODYNAMICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. The first law of thermodynamics refers to _____
   (a) dq = dw (b) dq = mcp(T_2-T_1)
   (c) Both (a) and (b) (d) None of the above

2. The energy possessed by the body by virtue of its position is
   (a) Kinetic energy (b) Pressure energy
   (c) Potential energy (d) Both (a) and (b)

3. Boyle's law states _____
   (a) $P \propto 1/V, T = C$ (b) $P \propto V$, $T = C$
   (c) Both (a) and (b) (d) None of these

4. Adiabatic process means _____
   (a) Heat is flowing continuous
   (b) Heat is removed
   (c) Heat is neither removed nor added
   (d) None of the above

5. The amount of heat required to raise the temperature by burning the fuel is _____

(a) Enthalpy

(b) Entropy

(c) Calorific value of fuels

(d) All of these

6. The formula $P \times \Delta V$ refers to

(a) Work (b) Heat transfer

(c) Both (a) and (b) (d) Either (a) or (b)

7. The function of intercooler in multistage compressors is to _____

(a) Cool both LP and HP cylinders

(b) To cool the temperature of air to enter into the HP cylinder keeping the temperature constant

(c) To liquify the gas or air

(d) All of these

8. Isothermal process refers to _____

(a) P = C (b) V = C

(c) T = C (d) All of these

9. The function of a spark plug is to _____

(a) Burn the engine

(b) Pre-heat the mixture

(c) To ignite the air-fuel mixture

(d) None of the above

10. Gas turbine works on the principle of _____

(a) Diesel cycle (b) Otto cycle

(c) Brayton cycle (d) Dual combustion cycle

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write short notes on systems and surroundings.

Or

(b) Explain various types of thermodynamics equilibrium.

12. (a) Explain the working of Carnot cycle with P-V and T-ϕ diagram.

Or

(b) Compare the performance of Otto cycle with Diesel cycle.

13. (a) Determine the minimum amount of air required for combustion.

Or

(b) Write short notes on Dalton's law and law of compression.

14. (a) Explain the terminology of various efficiencies of compressors.

Or

(b) Explain the advantages of multistage compression.

15. (a) Explain the working of closed gas turbine.

Or

(b) Explain the working of open gas turbine.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain the first and second laws of thermodynamics.

Or

(b) Explain the steady flow energy equation.

17. (a) Explain the working of the vapour absorption refrigeration cycle with a neat sketch.

Or

(b) Explain the properties of a mixture of gases.

18. (a) Explain the working of the centrifugal compressor.

Or

(b) Explain the axial flow compressor in a neat diagram.

19. (a) Explain the thermal efficiencies of gas turbines.

Or

(b) Explain the classification of gas turbines.

20. (a) Explain the working of the Brayton cycle and derive its air standard efficiency.

Or

(b) Explain liquification of gases.

———————

C–5875

Sub. Code
11851

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Aeronautical Science

PISTON ENGINE AND PROPELLER

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Section A (10 × 1 = 10)

Answer **all** questions.

1. The connecting rod in a piston engine connects the piston to

   (a) The cylinder head

   (b) The crankshaft

   (c) The camshaft

   (d) The flywheel

2. In a 4-stroke engine, how many crankshaft revolutions complete one cycle

   (a) 1 (b) 2

   (c) 3 (d) 4

3. Which accessory is responsible for starting a piston engine

   (a) Starter motor (b) Alternator

   (c) Magneto (d) Fuel pump

4. What type of pump is commonly used in the lubrication system of a piston engine

(a) Centrifugal pump

(b) Diaphragm pump

(c) Gear pump

(d) Reciprocating pump

5. Which aviation fuel is typically used in piston-engine aircraft

(a) Jet A-1 (b) Avgas 100 LL

(c) Diesel (d) Jet-B

6. What type of fuel injection system is commonly used in modern piston aircraft engines

(a) Direct injection

(b) Port fuel injection

(c) Throttle-body injection

(d) Gravity-fed injection

7. What component in the ignition system generates the high voltage required for the spark plug

(a) Battery (b) Fuel pump

(c) Carburetor (d) Magneto

8. During spark plug servicing, what tool is commonly used to check the gap between electrodes

(a) Torque wrench (b) Spark plug cleaner

(c) Feeler gauge (d) Multimeter

9. What is the primary opposing force acting against a propeller's motion in flight

(a) Weight (b) Drag

(c) Torque reaction (d) Centrifugal force

10. What is a common material used in composite propeller blades

(a) Aluminium (b) Mahogany wood

(c) Steel (d) Fiberglass and carbon

Section B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe the function of a crankshaft in a piston engine.

Or

(b) Differentiate between two-stroke and four-stroke piston engines.

12. (a) Discuss about super charger and turbo charger.

Or

(b) What are the characteristics of lubricating oil?

13. (a) Mention the steps involved in maintenance of float type carburetor.

Or

(b) Write short notes about aviation fuels and its characteristics.

14. (a) Describe the role of ignition shielding.

Or

(b) Discuss about magneto maintenance.

15. (a) Write about the forces acting on propeller in flight.

Or

(b) Differentiate between fixed and variable pitch propeller.

Section C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain in detail about the classification of piston engines.

Or

(b) How will you calculate the piston engine power and factors affecting engine performance?

17. (a) Discuss in detail about induction and exhaust manifold.

Or

(b) Explain about the components of lubricating system and their function.

18. (a) Explain carburetor icing and prevention.

Or

(b) Describe the principle and operation of fuel injection system.

19. (a) Explain the types, characteristics and operation of Magneto.

Or

(b) How will you carry out the spark plug pressure testing?

20. (a) Describe about the operations of pitch changing mechanism.

Or

(b) Write the features of composite blade propellers.

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C–5876

Sub. Code
11852

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Aeronautical Science

GAS TURBINE ENGINE

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the primary principle behind jet propulsion?
   (a) Conservation of momentum
   (b) Bernoulli's principle
   (c) Pascal's law
   (d) Newton's third law of motion

2. At what speed range does a ramjet engine typically operate most efficiently?
   (a) Subsonic speeds (b) Supersonic speeds
   (c) Hypersonic speeds (d) Low-speed cruising

3. In a turbine engine, what part is responsible for compressing the incoming air?
   (a) Combustion chamber
   (b) Turbine blades
   (c) Compressor blades
   (d) Nozzle

4. Which of the following components is most commonly used in gas turbine engines to reduce noise?

(a) After burner (b) Acoustic liners

(c) Turbine blades (d) Combustion chamber

5. The turboprop engine operates based on which thermodynamic cycle?

(a) Rankine cycle (b) Brayton cycle

(c) Stirling cycle (d) Otto cycle

6. The torque required for propeller horse power calculations is typically measured in

(a) Pounds per square inch (PSi)

(b) Pounds of thrust

(c) Newton-meters (Nm)

(d) Kilograms per hour (Kg/h)

7. What is the freezing point of Jet A fuel?

(a) –40°C (b) –50°C

(c) –60°C (d) –70°C

8. Which of the following components is directly controlled by the FADEC system?

(a) Airspeed

(b) Engine fuel flow

(c) Aircraft altitude

(d) Hydraulic pressure

9. Which of the following oil characteristics is most important for lubrication in high-temperature environments, such as in gas turbines?

(a) Low viscosity (b) High density

(c) Low pour point (d) High flash point

10. Where is the Auxiliary Power Unit (APU) typically located on an aircraft?

(a) In the tail section of the aircraft

(b) In the engine nacelle

(c) Near the cockpit

(d) In the fuselage, near the wings

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the principles of Jet Propulsion.

Or

(b) Describe Airflow through Gas turbine Engine.

12. (a) Write short notes on subsonic and supersonic inlets.

Or

(b) Explain the noise suppression system.

13. (a) Briefly explain the various types of forces acting on a propeller.

Or

(b) Explain the Turbo prop engine operation.

14. (a) Describe various types of Jet Fuel.

Or

(b) Explain about Fuel Control Unit.

15. (a) Discuss the functions of lubrication system.

Or

(b) Briefly explain Ignition System of Engine.

Part C

(5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain the types of Gas turbine engines.

Or

(b) Describe the factors affecting the thrust and performance of Gas turbine Engine.

17. (a) Discuss in detail of after burner system and variable area exhaust nozzle of Gas turbine engine.

Or

(b) Explain the thrust calculation procedure for Turbojet Engine.

18. (a) Explain the functions of propeller control unit.

Or

(b) How horsepower calculations are derived for propeller?

19. (a) Explain the characteristics of Jet Fuel.

Or

(b) Briefly explain about FADEC system.

20. (a) Explain the types of lubricants.

Or

(b) Describe the working principle of airturbine and combustion starters.

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C–5878	Sub. Code 11853B

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Aeronautical Science

AIRCRAFT COMMUNICATION AND NAVIGATION SYSTEM

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is space wave?
   (a) Any waves with frequency above 2 MHz
   (b) Any waves with frequency below 2 MHz
   (c) Any waves with frequency above 30 MHz
   (d) Any waves with frequency below 30 MHz

2. Dynamic Microphone works based on principle of'
   (a) Wave theory
   (b) Electromagnet
   (c) Variable resistance
   (d) Magnetism

3. During transmission the transmit receive switch of VHF communication system connects antenna
   (a) to amplifier (b) to transmitter
   (c) to receiver (d) to antenna coupler

4. SATCOM covers any area between
   (a) Latitude 85° North and 85° South
   (b) Latitude 75° North and 75° South
   (c) Latitude 65° North and 65° South
   (d) Latitude 55° North and 55° South

5. ADF is used to find the direction of
   (a) Aircrafts (b) Airports
   (c) Radio stations (d) VOR stations

6. Localizer transmitter of ILS provides
   (a) Vertical reference
   (b) North reference
   (c) Horizontal reference
   (d) South reference

7. The purpose of ATC transponder is to identify
   (a) Aircrafts in air
   (b) Aircrafts in the airport
   (c) Aircrafts on radar scope
   (d) Aircrafts on the runway

8. The radio altimeter is used to measure accurate
   (a) altitude of aircraft above sea level
   (b) distance of ATC
   (c) distance of VOR station
   (d) altitude of aircraft above ground level.

9. The radar helps the pilot to view the
   (a) ATC
   (b) Dangerous weather ahead
   (c) Terrain
   (d) Other aircrafts

10. The radar scope is called as

(a) PPI (b) RMI

(c) CDI (d) Display

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b)

11. (a) Draw a block diagram of radio transmitter and explain.

Or

(b) What are the different frequency bands used for radio system?

12. (a) Explain the operation of selcal decoder.

Or

(b) Explain testing of Communication Radio.

13. (a) Explain the principle of loop antenna.

Or

(b) Describe Radio Magnetic Indicator

14. (a) What are the procedures for installation of radio equipment?

Or

(b) Explain the functions of cockpit voice recorder.

15. (a) What are the Radar frequency bands?

Or

(b) Write short notes on Radome.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b)

16. (a) Draw a block diagram of Superheterodyne receiver and explain.

Or

(b) What are the different types of microphone? Explain.

17. (a) Draw the block diagram of VHF transmitter and explain,

Or

(b) Explain HF communication system.

18. (a) Explain the operation of Automatic Direction Finder.

Or

(b) Explain the operation of VOR transmitter.

19. (a) Explain the operation of ELT.

Or

(b) Explain Ground proximity warning system.

20. (a) Draw a block diagram of analog Radar and explain.

Or

(b) Explain the safety precautions while handling aircraft weather radar system,

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C–5880	Sub. Code 11854A

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Aeronautical Science

AIRPORT AND AIR TRAFFIC SERVICE

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the primary purpose of a stop way at an airport?
   (a) To provide an area for aircraft to park
   (b) To serve as an emergency runway
   (c) To provide extra stopping distance for aircraft during a rejected take off
   (d) To mark the beginning of the runway
2. What is the primary purpose of the wings of an aircraft?
   (a) To generate lift
   (b) To provide stability
   (c) To control the direction of flight
   (d) To house the engines
3. What is the function of ailerons on an aircraft?
   (a) To control the roll of the aircraft
   (b) To control the yaw of the aircraft
   (c) To control the pitch of the aircraft
   (d) To increase lift during takeoff and landing

4. What is the purpose of the landing gear on an aircraft?

(a) To support the aircraft on the ground

(b) To generate lift during takeoff

(c) To control the direction of flight

(d) To house the fuel tanks

5. Where is ICAO's headquarters located?

(a) New York City (b) London

(c) Montreal (d) Geneva

6. In a hub and spoke system, the 'hub" city typically serves as

(a) A small, local airport

(b) A major connecting point for flights

(c) A destination for only long-distance travel

(d) A maintenance facility for aircraft

7. What is an airport slot?

(a) A designated time period allocated for an aircraft to arrive or depart at an airport

(b) A parking space for aircraft at the airport

(c) A discount offered by the airport to airlines

(d) A gate assigned to an aircraft for boarding

8. What is the colour of runway edge lights?

(a) White (b) Green

(c) Amber (d) Blue

9. What is the main cause of turbulence during flight?

(a) The temperature of the air

(b) The movement of air over mountains or obstacles

(c) Clear skies

(d) High pressure systems

10. DME measures the distance between

(a) Aircraft and runway

(b) Aircraft and control tower

(c) Aircraft and ground station

(d) Aircraft and other aircraft

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write short notes on functions of DGCA.

Or

(b) Write short notes on functions of AAI.

12. (a) Briefly explain the parts of an Aircraft.

Or

(b) What are the precautions taken during Fuelling.

13. (a) Write short notes on the Terminal Configuration.

Or

(b) Write short notes on the Aircraft Parking Configuration.

14. (a) Write short notes on VASI.

Or

(b) Briefly explain the Taxiway Lighting System.

15. (a) Write short notes on Visual Flight Rules.

Or

(b) Write short notes on Marker Beacon.

Part C

(5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain-aircraft characteristics.

Or

(b) Explain the role of Meteorology in Aviation.

17. (a) Explain the Functions of Airport.

Or

(b) Explain in detail about the Hub and Spoke Strategies.

18. (a) Explain the functions of an Air Traffic Control.

Or

(b) Explain the Classification of an Air Space.

19. (a) Explain in detail about the Airport Rescue Services.

Or

(b) Explain-Air Freedom Rights.

20. (a) Explain – IATA and its functions.

Or

(b) Explain the Role of Telecommunication in Aviation.

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C–5885	Sub. Code 11855C

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Fifth Semester

Aeronautical Science

WIND TUNNEL TECHNIQUES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the purpose of a diffuser in a low speed wind tunnel?

   (a) To accelerate airflow

   (b) To decelerate airflow

   (c) To mix air and fuel

   (d) To measure air pressure

2. Which non dimensional number characterizes the ratio of inertial forces to viscous force?

   (a) Reynolds number (b) Weber number

   (c) Mach number (d) Prandtl number

3. What is the purpose of a nozzle in a high speed wind tunnel?

   (a) To slowdown airflow

   (b) To mix air and fuel

   (c) To accelerate airflow

   (d) To measure air pressure

4. Which phenomenon occurs when airflow accelerates to supersonic speeds?

(a) Shockwave formation
(b) Boundary layer separation
(c) Laminar flow
(b) Turbulent flow

5. What is the typical mach number range for hypersonic wind tunnels?

(a) Mach 0-1 (b) Mach 1-5
(c) Mach 5-10 (d) Mach 10-20

6. What is the primary purpose of a gun tunnel?

(a) To test aircraft models at supersonic speed
(b) To test spacecraft models at hypersonic speed
(c) To test materials at high temperature
(d) To test models at high mach numbers for short durations

7. Six component balance in a wind tunnel is used to measure

(a) Aerodynamic forces and moments
(b) Wind tunnel flow
(c) Model deformation
(d) Wind tunnel noise

8. Which is the following is NOT measured by a six-component balance

(a) Lift (b) Drag
(c) Flow velocity (d) Pitching moment

9. What is the purpose of the Schlieren technique?

(a) To visualize flow patterns
(b) To measure surface pressure
(c) To measure temperature
(d) To visualize shockwaves

10. Which technique is used to measure velocity profiles?

(a) Hot-wire anemometry

(b) Tuft testing

(c) Oil flow visualization

(d) Pressure tapping

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Describe about the types of similarities.

Or

(b) Write a short note about the wind tunnel and its applications.

12. (a) Differentiate between Low speed and High speed wind tunnel.

Or

(b) Write a short note about In-draft wind tunnel.

13. (a) Describe about the Automobile wind tunnel.

Or

(b) Write a short note about Spin tunnel.

14. (a) Differentiate between steady and unsteady measurements.

Or

(b) Write a short note about the calibration of measuring instruments.

15. (a) What is Flow visualization? Describe about smoke technique.

Or

(b) Write a short note on Tuft technique.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain about the Non-dimensional numbers in detail.

Or

(b) Explain in detail about the working principle of Low speed wind tunnel with neat sketch.

17. (a) Discuss about the Blow down wind tunnel layout and its design features in detail.

Or

(b) Discuss about the peculiar features and operational difficulties of transonic tunnel.

18. (a) Explain the working principle of hypersonic wind tunnel with neat diagram.

Or

(b) With the help of neat sketch explain Gun tunnel in detail.

19. (a) Discuss about the Instrumentation and sensors required for unsteady measurements.

Or

(b) Explain about the force measurement using three component balance in detail.

20. (a) Discuss about the dye injection technique in detail.

Or

(b) What is PIV? Explain in detail about the working principle of it.

C–5895

Sub. Code
11852

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Fifth Semester

Aeronautical Science

PISTON ENGINE AND PROPELLER

(2016 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Carnot cycle?

2. What is valve timing?

3. Define supercharger.

4. Write a short note on crank shaft.

5. List out the components of lubricating system.

6. What is carburetor ice protection?

7. What is magneto generator?

8. Define spark plug.

9. What is propellor control?

10. What is variable pitch propellor?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) List out the types of piston engine.

Or

(b) Discuss the factors that affecting the engine performance.

12. (a) Discuss valve operating mechanism in piston engine.

Or

(b) Explain function of turbo charger.

13. (a) Discuss the different types lubricating system.

Or

(b) Explain function of carburetor.

14. (a) Discuss the magneto timing procedure.

Or

(b) Explain the function Ignition system.

15. (a) What are the forces acting on propellor in flight?

Or

(b) Discuss about various factors affecting propeller performance.

Part C

(3 × 10 = 30)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain the construction and working principle of piston engine.

Or

(b) Explain the construction and function of crank shaft and crank case.

17. (a) Explain about Aircraft Propeller Reduction Gearing and Propeller Shafts?

Or

(b) Write a short note on maintenance procedure of (i) float type carburetor (ii) fuel injection system.

18. (a) Explain the overrunning clutch mechanism and its maintenance process.

Or

(b) What are the benefits of composite propellor over wooden? Explain.

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C–5897	Sub. Code 11854

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Aeronautical Science

AIRCRAFT ELECTRICAL SYSTEM

(2016 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Describe the direction of current flow in electrical system.

2. What is the purpose of relay switches?

3. Describe about ground power unit.

4. What batteries are used in electric aircraft?

5. List out the types of generators used in aircraft.

6. What is AC generator?

7. What is the routing of electrical cables?

8. What is split power system in Aircraft?

9. What is the navigation light circuit?

10. What is antiskid brake system.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the circuit protection devices used in aircraft?

Or

(b) What is the difference between a solenoid and a relay in aviation?

12. (a) Why are nickel cadmium batteries used in aircraft? Explain.

Or

(b) How does a ground power unit work?

13. (a) What is the difference of starter generator and generator?

Or

(b) What is the main purpose of constant speed drive unit for a generator?

14. (a) Why does each wire on an airplane have its own identification number?

Or

(b) Write the difference between grounding and shielding?

15. (a) Explain landing gear actuation.

Or

(b) State the importance of antiskid brake system.

Part C (3 × 10 = 30)

Answer **all** questions, choosing either (a) or (b).

16. (a) What are the types, purpose and uses of aircraft circuit breakers. Explain.

Or

(b) Discuss in detail about the difference between lead-acid battery and nickel cadmium battery in aviation?

17. (a) Briefly discuss the construction, working principle of lead acid battery and nickel cadmium battery.

Or

(b) Explain how does a high power brush less alternators work.

18. (a) Explain in details large aircraft power distribution system with diagram.

Or

(b) Explain the following

(i) Landing and taxi light circuit

(ii) Navigation light circuit.

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C–5899

Sub. Code
11865

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Sixth Semester

Aeronautical Science

TRAVEL AND TOUR MANAGEMENT

(2016 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the history of tourism?

2. How does Thomas cook satisfies its customer?

3. State the importance of accommodation sector.

4. List out the documents required to make travel.

5. What is tourism geography?

6. How do you create a travel itinerary?

7. What does a travel agency do?

8. What is MICE travel

9. State the objective of ITDC.

10. What is travel agency association of India?

Part B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b)

11. (a) List out the types of tour operator.

Or

(b) Write the difference between wholesale and retail travel agency.

12. (a) What is the importance transportation sector in travel industry?

Or

(b) How have ancillary services changed over time?

13. (a) Explain the importance of itinerary planning.

Or

(b) Discuss the components of group tour planning.

14. (a) Why is diversification being important in business and marketing?

Or

(b) How to get IATA accreditation for a travel agency?

15. (a) Explain the role of world tourism organization.

Or

(b) What does IATO stand for. Explain its function?

Part C

(3 × 10 = 30)

Answer **all** questions, choosing either (a) or (b)

16. (a) Explain the successes story of American Express company.

Or

(b) Briefly explain linkages and integration in travel trade.

17. (a) Explain the scope and current trends in travel industry sector in Tamilnadu.

Or

(b) Discuss different types and elements of a tour packages. Give proper examples.

18. (a) Explain the role and functions of travel agency with suitable example.

Or

(b) Discuss the roles and responsibilities of travel associates for the following.

(i) ITDC

(ii) IATO

(iii) PATA

(iv) IHRA

(v) ICCA

(vi) IAPA

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