Academic Block 2 – Systems 1 (SY190), UPT 2.5 Practice Test (Sample)

Study Guide

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Questions

1. Which handle prevents smoke and fumes from entering the cockpit after an engine shutdown?

A. Throttle Control

B. Firewall Shutoff

C. Fire Extinguisher Handle

D. Cabin Air Control

2. Which engine indicator is likely impacted by engine failure but not typically by PMU failure?

A. N1

B. TEMPERATURE

C. RPM

D. FUEL FLOW

3. What type of bleed air is filtered through the water separator?

A. Engine start air

B. Anti-g air

C. Cabin air

D. Environmental control air

4. How do both the primary jet pump and the transfer jet pumps operate?

A. Gravity flow

B. Capillary action

C. Venturi flow

D. Suction flow

5. External power is distributed on which bus?

A. Control Bus

B. Battery Bus

C. Power Bus

D. Avionics Bus

6. What is the primary function of the Avionics Master Switch?

A. Powers all avionics and radio systems

B. Controls engine power

C. Operates landing gear

D. Manages fuel systems

7. What type of systems power the nose wheel steering?

A. Electrical and Mechanical only

B. Hydraulic and Mechanical only

C. Electrical, Mechanical, and Hydraulic

D. Only Electrical

8. In the event of an engine failure and loss of oil pressure, what position does the propeller revert to?

A. Low pitch

B. Feathered

C. High pitch

D. Idle

9. Which set of landing gear doors is operated using hydraulic power?

A. Main Gear Inboard Doors

B. Tailwheel Doors

C. Flap Doors

D. None of the above

10. What is the primary purpose of the Trim Aid Device (TAD)?

A. Enhance fuel efficiency

B. Maintain directional trim

C. Control airspeed

D. Ensure mechanical safety

Answers

1. B
2. A
3. B
4. C
5. B
6. A
7. C
8. B
9. A
10. B

Explanations

1. Which handle prevents smoke and fumes from entering the cockpit after an engine shutdown?

A. Throttle Control

B. Firewall Shutoff

C. Fire Extinguisher Handle

D. Cabin Air Control

The correct option, which is the firewall shutoff, is designed specifically to prevent smoke and fumes from entering the cockpit after an engine shutdown. This is a critical safety feature in aircraft design. When activated, the firewall shutoff closes off fuel supply lines or other pathways that could allow hazardous fumes from the engine compartment to infiltrate the cockpit area. This mechanism enhances the safety of both the crew and passengers by ensuring that any potential contaminants or hazardous conditions are isolated from the cabin environment, especially in emergency situations. The maintenance of a clean air supply in the cockpit is essential for ensuring pilot visibility and performance during critical phases of flight or emergencies. The other handles and controls mentioned would not serve the same preventative function regarding smoke and fumes. For instance, the throttle control manages the engine power output, while the fire extinguisher handle is used in case of an in-flight fire, and the cabin air control primarily influences the internal air circulation or temperature within the cabin itself, not preventing external smoke or fumes from entering.

2. Which engine indicator is likely impacted by engine failure but not typically by PMU failure?

A. N1

B. TEMPERATURE

C. RPM

D. FUEL FLOW

The N1 indicator, which reflects the speed of the fan or low-pressure compressor in a turbofan engine, is the correct choice because it is directly influenced by the engine's operational status. In the event of engine failure, you would expect to see a significant change in the N1 reading, as the engine would not be producing thrust or generating the necessary airflow. On the other hand, the PMU (Power Management Unit) primarily manages engine performance and operational parameters by controlling fuel flow, ignition timing, and other factors. While PMU failure can certainly cause irregularities in engine performance, it does not directly lead to an engine failure or cause a change in the N1 indicator. Instead, PMU failure might still allow the engine to continue operating at a lower efficiency or with unoptimized settings. The impact of an engine failure would manifest as a loss of N1, distinguishing its direct relationship with engine health compared to other indicators like temperature, RPM, or fuel flow, which may not directly reflect engine failure in the same way.

3. What type of bleed air is filtered through the water separator?

A. Engine start air

B. Anti-g air

C. Cabin air

D. Environmental control air

The correct choice, which pertains to the type of bleed air that is filtered through the water separator, is associated with "Anti-g air." This type of air is used primarily in systems that require atmospheric management to prevent the effects of high g-forces on pilots, particularly in combat aircraft. The water separator plays an essential role in ensuring that this air is free from moisture, which could otherwise affect performance and safety. In aviation, bleed air is often captured from the engine and is critical for various systems. However, only anti-g air specifically requires filtration through a water separator to ensure that moisture is removed before it enters the pilot's g-suit or other systems reliant on this air, thus ensuring the operational effectiveness and safety of the aircraft's personnel. Other types of air, while important, do not necessarily require this specific filtration process.

4. How do both the primary jet pump and the transfer jet pumps operate?

A. Gravity flow

B. Capillary action

C. Venturi flow

D. Suction flow

The primary jet pump and transfer jet pumps operate based on the principle of Venturi flow. This principle involves the use of a fluid moving through a nozzle, which creates a change in pressure. When the fluid flows through a constricted area, it speeds up, and as a result, the pressure drops. This pressure drop causes fluids from surrounding areas to be drawn towards the pump, effectively allowing the jet pump to move fluid from one location to another. In the case of both the primary jet pump and transfer jet pumps, they utilize jets of fluid to create a low-pressure area that facilitates the movement of other fluids. This mechanism is efficient and widely used in various engineering applications to convey fluids without the need for mechanical moving parts, making it a fundamental example of how fluid dynamics can be applied in pumping systems.

5. External power is distributed on which bus?

A. Control Bus

B. Battery Bus

C. Power Bus

D. Avionics Bus

The distribution of external power is primarily associated with the Battery Bus. This bus is designed to handle the power supplied to various systems in the aircraft when external power is not available, allowing it to utilize battery reserves effectively. In many aircraft systems, the Battery Bus connects to other buses, providing power to essential components during operations when external power, such as ground support equipment, isn't in use. In contrast, other buses like the Control Bus are responsible for communication and control signals among components and do not handle power itself. The Power Bus serves a similar function but is usually tied to specific power-related activities and not typically where external power is first managed. The Avionics Bus connects to electronic systems for navigation and communication but again, does not distribute external power as its primary function. Therefore, identifying the Battery Bus as the correct bus for distributing external power recognizes its role in managing electrical energy needs in an aircraft environment.

6. What is the primary function of the Avionics Master Switch?

A. Powers all avionics and radio systems

B. Controls engine power

C. Operates landing gear

D. Manages fuel systems

The primary function of the Avionics Master Switch is to power all avionics and radio systems in an aircraft. This switch is crucial for the operation of a variety of electronic instruments required for navigation, communication, and monitoring of the aircraft systems. When the Avionics Master Switch is engaged, it allows the necessary electrical power to flow to these systems, enabling pilots to access important flight data, communicate with air traffic control, and ensure the overall functionality of aircraft instruments. It is a fundamental component in maintaining operational readiness for all electronic systems that are vital for flight safety and efficiency.

7. What type of systems power the nose wheel steering?

A. Electrical and Mechanical only

B. Hydraulic and Mechanical only

C. Electrical, Mechanical, and Hydraulic

D. Only Electrical

Nose wheel steering systems typically utilize a combination of electrical, mechanical, and hydraulic components to achieve effective steering control. The hydraulic system provides the strength and responsiveness needed to turn the nose wheel, especially at low speeds or during maneuvering on the ground. The mechanical components work to connect the steering input from the cockpit to the nose wheel itself, ensuring that movements are translated accurately. Additionally, electrical systems often play a crucial role in enhancing control, such as by providing feedback to the pilot or enabling electronics to assist with steering inputs. The integration of all three types of systems allows for better maneuverability and precision, making the combination of electrical, mechanical, and hydraulic systems the most effective solution for nose wheel steering in aircraft. This multifaceted approach takes advantage of the strengths of each system type, leading to safer and more reliable operation.

8. In the event of an engine failure and loss of oil pressure, what position does the propeller revert to?

A. Low pitch

B. Feathered

C. High pitch

D. Idle

When there is an engine failure and subsequent loss of oil pressure, the propeller typically reverts to a feathered position. This position minimizes drag on the aircraft, which is critical during an emergency situation such as an engine failure. Feathering the propeller effectively aligns the blades with the directional flow of air, thereby reducing resistance and allowing the aircraft to maintain gliding capability. In scenarios involving multi-engine aircraft, feathering is particularly important as it helps the pilot control the aircraft's performance and configuration after one engine has failed. It enhances the aircraft's glide performance and allows for a more effective emergency landing. The other positions mentioned, such as low pitch, high pitch, and idle, would not reduce drag as effectively as feathering and could potentially lead to greater control challenges during an engine-out situation. Thus, reverting to feather is the most beneficial and safety-oriented response in the event of engine failure and loss of oil pressure.

9. Which set of landing gear doors is operated using hydraulic power?

A. Main Gear Inboard Doors

B. Tailwheel Doors

C. Flap Doors

D. None of the above

The correct answer is the set of Main Gear Inboard Doors, which are commonly operated using hydraulic power. In many aircraft designs, hydraulic systems are utilized for various functions, particularly for components that require significant force or precision. The Main Gear Inboard Doors are integral to the landing gear mechanism, allowing the doors to open and close smoothly during gear extension and retraction. Hydraulic systems provide the necessary pressure to operate these doors effectively, enabling them to seal tightly when closed, thus minimizing aerodynamic drag and protecting the landing gear components during flight. This is critical for ensuring the aircraft's efficiency and structural integrity. While tailwheel doors and flap doors serve essential functions on an aircraft, they typically do not rely on hydraulic power in the same way as the Main Gear Inboard Doors. Tailwheel doors might be actuated mechanically or pneumatically, and flap doors often use electrical systems or alternate methods of actuation, depending on the aircraft's design. Therefore, understanding the role of hydraulics in landing gear systems helps clarify why the Main Gear Inboard Doors are the correct choice in this context.

10. What is the primary purpose of the Trim Aid Device (TAD)?

A. Enhance fuel efficiency

B. Maintain directional trim

C. Control airspeed

D. Ensure mechanical safety

The primary purpose of the Trim Aid Device (TAD) is to maintain directional trim. This device is essential in ensuring that an aircraft flies straight and level without requiring constant control inputs from the pilot. By automatically adjusting the control surfaces to counteract unwanted yaw or roll, the TAD helps achieve and sustain the desired flight path. This is particularly important in maintaining stability and ease of handling, reducing pilot workload during flight. Fuel efficiency, airspeed control, and mechanical safety are important considerations in aviation, but they are not the primary functions of the TAD. Instead, the TAD focuses on aiding the pilot in managing the aircraft's trim, thus enhancing overall flight performance and safety.