

## **DC-3 Airways - Training Division Ground School - DC-3 EXAM**

### **A) AIRCRAFT GENERAL**

1. What is the wingspan and height of the DC-3C with the tail down?
2. What is the MTOW of the DC-3C?
3. What is the maximum recommended cross-wind takeoff component?
4. During a turn while taxiing, if the wing clears an object, will the tail necessarily clear the same object?
5. How are the flaps held in position?
6. How many trim tabs are there?
7. Is the aileron trim tab located on the left or right side?
8. How many flap sections?
9. What's the angle of the flaps in the full down position?
10. Are the elevators interchangeable?
11. How long are the ailerons?
12. What is the maximum speed in knots for full flaps?
13. What are the maximum airspeeds associated with the flap settings?
14. What condition is commonly known to affect rudder control during engine failures and incorrect application of controls?
15. What's the purpose of the small aluminum air scoop located on the outboard side of each engine nacelle forward and below the exhaust stack?

### **B) ELECTRICAL**

1. What are the generator voltage and amperage ratings?
2. What does the speed of the inverters control?
3. What is the nominal voltage of the DC bus system?
4. Where are the batteries located?

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### **C) FUEL SYSTEM**

1. In which direction must the fuel quantity indicator switch be turned?
2. How much fuel is considered unusable for each of the 4 tanks?
3. What is the total capacity of each Main tank?
4. What is the total capacity of each Auxiliary tank?

### **D) POWER PLANT**

1. What type of engines are installed?
2. What is the reduction gear ratio?
3. Does the tachometer read engine or prop RPM?
4. What is maximum power on the R1830-90D?
5. What is the maximum allowable cylinder head temperature?
6. What is the maximum allowable inlet oil temp?
7. What is maximum oil pressure?
8. What is the total capacity of the oil tank?
9. Where does the feathering pump get its oil supply?
10. Does the firewall shutoff valve shut off all oil through the firewall?
11. At what temperature indications can the engine be used with increased power settings?
12. What items does the firewall shutoff valve secure?
13. What is the maximum permissible RPM drop during Run-Up?
14. What are the maximum continuous Takeoff Power horsepower and settings?
15. What MP setting should a power check be completed at?
16. What RPM indicates a normal power check during run-up?
17. How many cylinders on the R1830 engine?
18. Where is the number 1 cylinder?
19. Which spark plugs are fired by which magneto?
20. What are the visual differences between the R1830-92 series engine and the -75 / -94 series?
21. What are the four positions for the mixture control?

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### **E) PROPELLER**

1. What kind of propeller is installed?
2. What is the minimum low pitch angle?
3. What is the maximum prop diameter? Needle blades and Paddle blades?
4. Where is the propeller governor located?
5. How many gallons of oil are always available for prop feathering?
6. Where does the oil for feathering operation come from?
7. What is the propeller speed when the tachometer reads 1600 RPM?

### **F) FIRE PROTECTION**

1. How many fire zones are there, and where are they located?
2. Where is the engine fire bottle located?
3. What does the perforated metering line connect to on the top side of the accessory section of the engine?

### **G) HYDRAULIC POWER SYSTEM**

1. What color is the hydraulic fluid?
2. What is the numerical indicator/identifier for the hydraulic fluid?
3. What five systems operate off the main hydraulic system?
4. What purpose does the accumulator serve?
5. Why are the gear and flap handles split after shutdown?
6. What is the hydraulic system capacity?
7. What is the hydraulic system tank capacity?
8. Where is the hydraulic tank located?
9. What is the hydraulic tank reserve capacity?
10. What is the normal hydraulic system operating pressure?
11. The fluid present in the sight glass represents what capacity?
12. The hand pump is used mostly during what operations?
13. What are the selectable positions for the cowl flap selector valve?

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### **H) VACUUM SYSTEM/PITOT STATIC SYSTEM**

1. What instruments are connected to the vacuum system?
2. What instruments are connected to the static system?
3. What's the purpose of the alternate static source?
4. How many pitot tubes are employed on the DC-3?
5. Where are the static ports located?

### **I) LANDING GEAR AND BRAKES**

1. What is the maximum gear extension speed?
2. What holds the landing gear down?
3. What pressure should the landing gear pressure gage read before returning the gear handle to neutral position after lowering the gear?
4. After unlocking the tail wheel, a slight turn to which direction may be necessary to retract the locking pin?
5. During normal flight, what holds the landing gear in the up position?
6. What must be in place with respect to the landing gear, whenever the aircraft is not in operation?
7. What stops the landing gear from going into the wheel well?
8. What are the sizes of the main and rear tires?
9. What is the normal tire pressure for the main and rear tires?
10. What is used to adjust the clearance on the main struts?

### **J) PERFORMANCE**

1. What airspeed is V1/V2?
2. What airspeed is VMC?
3. What are normal cruise power settings?
4. Describe MP and RPM settings for Takeoff power and METO power?
5. What are Climb and Alternate Climb power settings?
6. What power settings are used for descent?
7. Why do you not reduce MP below RPM setting?
8. What airspeed do you maintain until Cruise altitude?

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9. What is the preferred descent airspeed?
10. At what airspeed do you descend with the landing gear in the down position?
11. At what position are the Cowl Flaps set during takeoff and climb?
12. What position are the cowl flaps set during cruise and descent?
13. In which situations would oscillations be encountered which could result in a ground loop?
14. At what airspeed should aft pressure be imposed on the control yoke to bring the tail down after landing?
15. What is the most common and preferred type of landing?

### **K) EMERGENCY PROCEDURES**

1. In the event of a slight power loss during intense rain storms or while flying through clouds what items should be applied immediately?
2. What transponder squawk code is used for emergencies?
3. What transponder squawk code is used for radio/communication failures?
4. What is the first thing that the crew is required to do once the aircraft has stopped and all operating systems are not in use?

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## **ANSWER SHEET**

### **A) AIRCRAFT GENERAL**

- A-1 95' wingspan/16' 11 1/8"
- A-2 26,900 lbs
- A-3 13 knots
- A-4 Yes
- A-5 By trapped hydraulic fluid
- A-6 4
- A-7 Right Side
- A-8 4
- A-9 45 degree angle
- A-10 Yes
- A-11 24 feet
- A-12 97 KIAS
- A-13 1/4 - 135 KIAS, 1/2 - 99 KIAS, 3/4 - 97 KIAS, Full - 97 KIAS
- A-14 Rudder Lock
- A-15 Cooling of the engine mounts near the exhaust stack

### **B) ELECTRICAL**

- B-1 24v/88 amp
- B-2 Alternating Currents (AC)
- B-3 24v
- B-4 Under the nose of the fuselage, aft of the pitot mast

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### **C) FUEL SYSTEM**

- C-1 Clockwise
- C-2 4 Gallons in each tank/16 Gallons total
- C-3 202 Gallons
- C-4 200 Gallons

### **D) POWER PLANT**

- D-1 Pratt & Whitney R1830-90D
- D-2 16:9
- D-3 Engine RPM
- D-4 1200 HP
- D-5 245 Degrees C
- D-6 104 Degrees C
- D-7 120 PSI
- D-8 32 Gallon Tank (Will only hold 29 Gallons)
- D-9 Oil Tank
- D-10 No
- D-11 100 CHT & 40 degrees oil temp
- D-12 Oil and Hydraulic fluid
- D-13 100 RPM
- D-14 METO 42"/2550 RPM
- D-15 Ambient Atmospheric Pressure
- D-16 2300 RPM
- D-17 14
- D-18 Top, back row
- D-19 Left mag-rear/Right mag-front
- D-20 Where the magnetos are placed
- D-21 Idle cutoff, Auto Lean, Auto Rich, Emergency

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### **E) PROPELLER**

- E-1 Hamilton Standard Hydromatic quick feathering constant speed prop
- E-2 18 degrees
- E-3 Needle blades and Paddle blades - 11'6 3/8" / 11' 3 3/8"
- E-4 Top of nose case
- E-5 3 gallons
- E-6 Bottom of oil tank, below stand pipe
- E-7 900 RPM (16:9)

### **F) FIRE PROTECTION**

- F-1 3/ Zone 1-Power Section/Zone 2-Accessory Section/Zone 3-Wheel Well
- F-2 Behind the co-pilot seat
- F-3 Carb throat

### **G) HYDRAULIC POWER SYSTEM**

- G-1 red
- G-2 MIL 5606
- G-3 Wipers/Brakes/Flaps/Gear/Cowl flaps
- G-4 Acts as a cushion to absorb shock to the system
- G-5 To relieve pressure in the system
- G-6 28 quarts
- G-7 13 quarts
- G-8 Behind the copilot's bulkhead (hydraulic panel)
- G-9 3 quarts
- G-10 600-875 psi, varies (750-950)
- G-11 The fluid above the standpipe
- G-12 Ground operations
- G-13 Open/off/trail/off/closed



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### **H) VACUUM SYSTEM/PITOT STATIC SYSTEM**

- H-1 DG/Attitude Indicator
- H-2 Airspeed/Altimeter/VSI
- H-3 If primary static source becomes clogged
- H-4 2
- H-5 On the pitot masts

### **I) LANDING GEAR AND BRAKES**

- I-1 148 kts
- I-2 Hydraulic pressure
- I-3 System Pressure
- I-4 Right
- I-5 Trapped Hydraulic Pressure
- I-6 Safety Pins
- I-7 Gear Bumper
- I-8 17x16 Mains/9x6 Rear
- I-9 55psi Mains/60psi Tailwheel
- I-10 Hydraulic fluid and nitrogen

### **J) PERFORMANCE**

- J-1 84 kts
- J-2 77 kts
- J-3 25-28" MP @ 2100 RPM
- J-4 48"/2700 -TO, 42"/2550-METO
- J-5 35"/2300-Climb, 33"/2300-Alt Climb
- J-6 25"/2100 RPM
- J-7 To prevent Reverse Loading
- J-8 115 KIAS
- J-9 135-140 KIAS
- J-10 125 KIAS

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- J-11 Trail
- J-12 Close and Off
- J-13 Beginning Take Off and at the end of the landing (Tail coming down)
- J-14 60 KIAS
- J-15 Wheel Landing

### **K) EMERGENCY PROCEDURES**

- K-1 Carb Heat
- K-2 7700
- K-3 7600
- K-4 Chock the tires, Install the Rudder Lock and Landing Gear Pins