



Headquarters Air Cadets Examination

Senior Cadet
33/3 Propulsion
Generated 12-Aug-03

Serial: 558

1. Use black or dark blue pen, NOT pencil.
2. Mark one answer per question with a cross.
3. If you wish to change an answer, cancel the original mark and mark another single answer.

A selected answer.

A cancelled answer.

Mark:

Name and Initials _____

Date of Exam _____

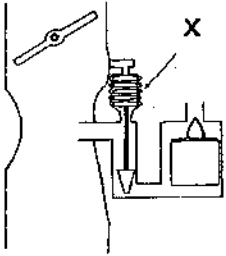
Date of Birth _____

Squadron/Unit _____

Wing _____

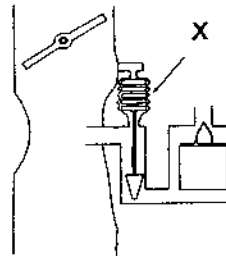
1 In this diagram of a simple carburettor of an aircraft piston engine, the carburettor is fitted with a control which automatically adjusts the mixture for changes in altitude. The arrow X points to an essential item. This item is:

- a A pitot tube
- b A reserve fuel chamber
- c A bi-metallic strip
- d An aneroid capsule



2 The arrow X points to a device which is often incorporated into the carburettor of a piston aero engine. What is its function?

- a Prevents the fuel/air mixture from becoming richer as the aircraft climbs
- b Supplies extra fuel when needed for acceleration
- c Encourages good atomisation of the fuel
- d Prevents the fuel/air ratio from becoming richer as the throttle valve is opened



3 What is the purpose of the scavenge pump in the dry-sump lubrication system of a piston engine?

- a To transfer oil from the crankcase to the oil tank
- b To ensure that all engine components are lubricated
- c To direct oil into the pressure chamber
- d To scavenge contaminants from the oil

4 Which of these is a turbojet engine?

- a Adour
- b Viper
- c Pegasus
- d Spey

5 Which of these is a turboshaft engine?

- a The Lynx Helicopter's Gem
- b Harrier's Pegasus
- c Boeing 747's RB211
- d Concorde's Olympus

6 Which of the following statements applies to the ramjet engine?

- a It has no moving parts
- b It is most efficient at subsonic speeds
- c It has only one turbine
- d It has only one compressor

7 In a piston engine, the camshaft runs at:

- a A quarter of the engine speed
- b Engine speed
- c Half engine speed
- d Twice engine speed

8 The purpose of gudgeon pins in a piston engine is to:

- a Attach the pistons to their connecting rods
- b Retain the valves in their guides
- c Fasten together the two halves of the crankcase
- d Hold the sparking plugs in place

9 What ratio (by weight) of fuel to air should the carburettor normally supply in a piston engine?

- a 01:02
- b 15:01
- c 01:15
- d 02:01

10 When a piston engine is accelerating, the purpose of an accelerator pump when fitted to the carburettor is:

- a Prevent the mixture from becoming rich
- b Increase the air pressure in the float chamber
- c Decrease the air pressure in the float chamber
- d Prevent the mixture from becoming weak

11 Which of these statements, about an exhaust-driven turbocharger, is true?

- a It operates best at low engine speeds
- b It operates best at high engine speeds
- c It is more effective than an engine-driven supercharger at increasing the power output
- d It operates as soon as the throttle is opened

- 12 What is the purpose of the fins which are arranged about the cylinder and cylinder head of an air-cooled engine?
- a To direct air through the engine compartment
 - b To allow heat to dissipate rapidly
 - c To support the engine cowlings
 - d To reduce the weight of the engine
-

- 13 When the airflow over the propeller blades of a failed engine keeps the propeller turning, this is known as:
- a Reverse thrust
 - b Propeller braking
 - c Windmilling
 - d Contra rotating
-

- 14 Which application or type of operation best suits the turbojet engine?
- a In low speed aircraft operating at low altitudes
 - b In static engines in industrial use
 - c In helicopters
 - d In high speed aircraft where low frontal area is an advantage
-

- 15 In a bypass engine, part of the air is fully compressed and is passed into the combustion chamber, whilst the remainder is compressed to a lesser extent and is ducted around the hot section. Which type of engine normally employs this system:
- a Turbojet
 - b Turboprop
 - c Turbofan
 - d Turboshaft
-

- 16 What is the primary function of a supercharger on a piston engine?
- a To ensure the battery is charged throughout the full range of engine speeds
 - b To make use of unburnt fuel in the exhaust gases
 - c To speed up the extraction of exhaust gases
 - d To increase the pressure in the induction manifold
-

- 17 Propeller braking involves:
- a Turning the blades beyond fine pitch
 - b Feathering the propeller
 - c The selection of coarse pitch
 - d The selection of fine pitch
-

- 18 Which of these is a turbofan engine?
- a Spey
 - b Tyne
 - c Gem
 - d Dart
-

- 19 Which of these is a turboprop engine?
- a Spey
 - b Dart
 - c Adour
 - d RB 211
-

- 20 After-burning in a jet engine involves burning additional fuel in the:
- a Compressor
 - b Jet pipe
 - c Turbine
 - d Combustion chamber
-

- 21 In a simple 4-stroke piston engine, which of these air-to-fuel ratios (by weight) would be the normal mixture?
- a 12:01
 - b 09:01
 - c 15:01
 - d 06:01
-

- 22 In a piston aero engine, the purpose of the distributor is to distribute:
- a The correct mixture of air and fuel to the cylinders
 - b High voltage electrical impulses to the cylinders
 - c Oil to all parts of the engine
 - d Cooling air to all external parts
-

- 23 What is the main benefit of using liquid (as opposed to air) to cool an aircraft piston engine?
- a The engine will be lighter
 - b The engine will be less costly to produce
 - c The engine will be simpler
 - d A steady operating temperature will be more easily maintained
-

- 24 Blade twist in a propeller helps to:
- a Make the blade stronger and lighter
 - b Make feathering possible
 - c Reduce noise levels
 - d Even out the thrust along the length of the blade
-

- 25 Who first patented, in 1930, the design of a reaction motor suitable for aircraft propulsion (that is, a jet engine)?
- a Henry Ford
 - b Charles Rolls
 - c Frank Whittle
 - d Henry Royce
-