



Headquarters Air Cadets Examination

Senior Cadet
Propulsion
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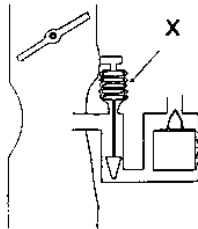
1. Use black or dark blue pen, NOT pencil.
2. Write only on the answer sheet. Add your personal details.

1 In the modified 4-stroke cycle, which of these is valve lead?

- a Exhaust valve closing after the piston has passed TDC
- b Inlet and exhaust valves are open together
- c Exhaust valve opening before the piston reaches BDC
- d Inlet valve closing after the piston has passed BDC

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



3 In a magneto, one purpose of the capacitor (condenser) is to:

- a Reduce erosion at the sparking plug gaps
- b Make the secondary current flow evenly
- c Make the primary current flow evenly
- d Reduce pitting of the contact breaker points

4 The function of the turbine in a turbojet engine is to:

- a Drive the gas stream into the atmosphere
- b Energise the gas stream
- c Vaporise the fuel as much as possible
- d Drive the compressor

5 For which of these applications is the turboshaft engine most suited?

- a High-speed combat aircraft
- b Helicopters
- c High-altitude reconnaissance aircraft
- d Low-speed fixed-wing aircraft

6 What characteristic of the piston engine permits the use of such efficiency-enhancing features as valve lead, valve lag and valve overlap:

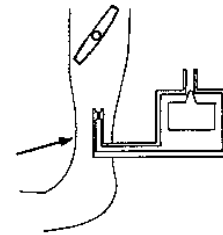
- a Ineffective crank angle at TDC and BDC
- b Its wide tolerance of operating temperatures
- c Its ability to be mounted at any angle
- d The ease with which extra cylinders may be added at the design stage

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

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

8 In this diagram of a simple carburettor, what does the arrow point to?

- a Choke tube
- b Float
- c Throttle valve
- d Main jet



9 What is the purpose of the fins which are arranged about the cylinder and cylinder head of an air-cooled engine?

- a To support the engine cowlings
- b To direct air through the engine compartment
- c To allow heat to dissipate rapidly
- d To reduce the weight of the engine

10 Which of these statements applies to a propeller that has been feathered?

- a Its leading edges are facing at 90 degrees to the direction of flight
- b It is producing maximum power
- c It is operating at its maximum rotational speed
- d Its leading edges are facing forwards into the direction of flight

11 Which application or type of operation best suits the turbojet engine?

- a In helicopters
- b In high speed aircraft where low frontal area is an advantage
- c In static engines in industrial use
- d In low speed aircraft operating at low altitudes

12 In a piston engine, ineffective crank angle occurs in the region of:

- a Both BDC and TDC
- b 90 degrees after BDC and TDC
- c BDC only
- d TDC only

13 Direct fuel injection is often used in aero piston engines, in preference to float chamber carburettors. Which of these statements applies to the direct fuel injection system?

- a It cannot operate inverted
- b There is no choke on the intake
- c A throttle butterfly is unnecessary
- d The fuel does not have to be vaporised

14 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 increase the pressure in the induction manifold
- c To make use of unburnt fuel in the exhaust gases
- d To speed up the extraction of exhaust gases

15 On a variable-pitch propeller, the largest obtainable pitch angle is known as:

- a Take-off pitch
- b Coarse pitch
- c Fine pitch
- d Optimum pitch

16 In the turboprop engine, some of the air is not compressed fully. This air is made to bypass the combustion chamber and the overall jet velocity is thereby reduced. An important consequence is that:

- a The propulsive efficiency at lower aircraft speeds is improved
- b The propulsive efficiency at higher aircraft speed is improved
- c All the residual thrust is removed
- d The residual thrust is higher

17 Which of these is a turboprop engine?

- a Spey
- b Adour
- c RB 211
- d Dart

18 After-burning in a jet engine involves burning additional fuel in the:

- a Compressor
- b Turbine
- c Jet pipe
- d Combustion chamber

19 In the modified 4-strokes cycle, ignition takes place:

- a Just before TDC on the power stroke
- b At TDC on the power stroke
- c At TDC on the compression stroke
- d Just before TDC on the compression stroke

20 Which of these statements refers to turbo-chargers? They are:

- a Driven by exhaust gases
- b Driven by gears from the engine
- c Fitted to turbo-fans only
- d Fitted to turbojet engines only

21 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 Oil to all parts of the engine
- c High voltage electrical impulses to the cylinders
- d Cooling air to all external parts

22 In an aircraft propeller system the function of the constant speed unit (CSU) is to:

- a Maintain a selected engine speed within the power available
- b Retard the ignition timing
- c Feather the propeller
- d Increase the mixture strength

23 The blade angle on a propeller is varied from a coarse angle at the root to a fine angle at the tip. This is called:

- a Variable pitch
- b Adjustable pitch
- c Blade twist
- d Blade translation

24 Which of these statements applies to a turboprop engine?

- a It is very inefficient at low aircraft speeds
- b It has very high residual thrust
- c It has an extra turbine compared with the turbo jet
- d It has one less turbine than the turbojet

25 Which of these statements about the ramjet engine is true?

- a It is very susceptible to compressor stall
- b It is like a turbojet from which the compressor and turbine have been removed
- c It requires an extra compressor to achieve the high ram pressure needed
- d It is used only in sub-sonic aircraft