



Headquarters Air Cadets Examination

578

Senior Cadet
33/3 Propulsion
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Serial: 578

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

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

2 A jet engine's compressor is driven by:

- a The turbine
- b Residual pressure in the tailpipe
- c The gearbox
- d Air pressure at the air intake

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

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

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

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

5 Which of these is a turboshaft engine?

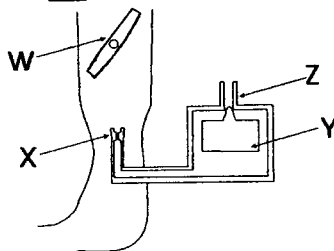
- a The Lynx Helicopter's Gem
- b Boeing 747's RB211
- c Harrier's Pegasus
- d Concorde's Olympus

6 In a piston engine, the camshaft runs at :

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

7 In this diagram of a simple carburettor, which arrow (W,X,Y or Z) points to the main jet?

- a Z
- b W
- c X
- d Y



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

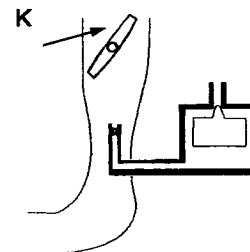
- a 01:15
- b 02:01
- c 01:02
- d 15:01

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

10 This is a diagram of a simple carburettor for a piston aero engine. The arrow K points to:

- a Slow running jet
- b Throttle valve
- c Choke tube
- d Diffuser



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

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

12 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 Turboshaft
- b Turboprop
- c Turbofan
- d Turbojet

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

14 Which of the following describes a magneto as used in an aircraft's piston engine?

- a A dynamo to produce the spark for the spark plugs
- b A secondary compass system
- c An instrument for metering the fuel flow
- d A mechanical pump for circulating fuel

15 A variable-pitch propeller is said to be feathered when:

- a It is in fully coarse pitch
- b The leading edges are at 90degrees to the direction of flight
- c It is in fully fine pitch
- d The leading edges face forward in the direction of flight

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

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

17 Which of these is a turbojet engine?

- a Tyne
- b Pegasus
- c Spey
- d Olympus 593

18 Which of these is a turbofan engine?

- a Spey
- b Dart
- c Tyne
- d Gem

19 Which of these is a turboprop engine?

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

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

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

21 In the modified 4-stroke cycle, ignition takes place:

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

22 What is the main function of a supercharger when fitted to a piston engine?

- a It increases the amount of air and fuel delivered to the cylinders
- b It ensures that the batteries are always fully charged
- c It increases the amount of lubricating oil delivered to the bearings
- d It delivers a stronger spark to the sparking plugs

23 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 15:01
- c 06:01
- d 09:01

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

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

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 Henry Royce
- c Charles Rolls
- d Frank Whittle