higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

AIRCRAFT MAINTENANCE THEORY N1

12 August 2021

This marking guideline consists of 6 pages.

QUESTION 1

1.1 A
1.2 B
1.3 C
1.4 A
1.5 A
1.6 B
1.7 B
1.8 A
1.9 A
1.10 A

(10 × 1) **[10]**

QUESTION 2

2.1 False
2.2 True
2.3 False
2.4 False
2.5 True

(5 × 1) **[5]**

QUESTION 3

3.1 A Outlet port
B Driven gear
C Drive gear
D Inlet port (4)

3.2 Gear-type pump (1)

3.3

(Sketch: 3 marks; label: 2 marks) (5)
[10]

QUESTION 4

4.1
- Strength
- Light weight
- High resistance to corrosion
- Ease of fabrication (Any 3 × 1) (3)

4.2
- Steel – brownish colour
- Aluminium – greyish colour
- Copper – greenish colour (3)

4.3
- Surface of metal exfoliate
- X-ray or ultrasonic (2)

4.4 Replace part (1)

4.5
- Intake stroke
- Compression stroke
- Power stroke
- Exhaust stroke (4)

4.6 4.6.1 A Spark plug
B Fuel injector
C Intake valve (3)

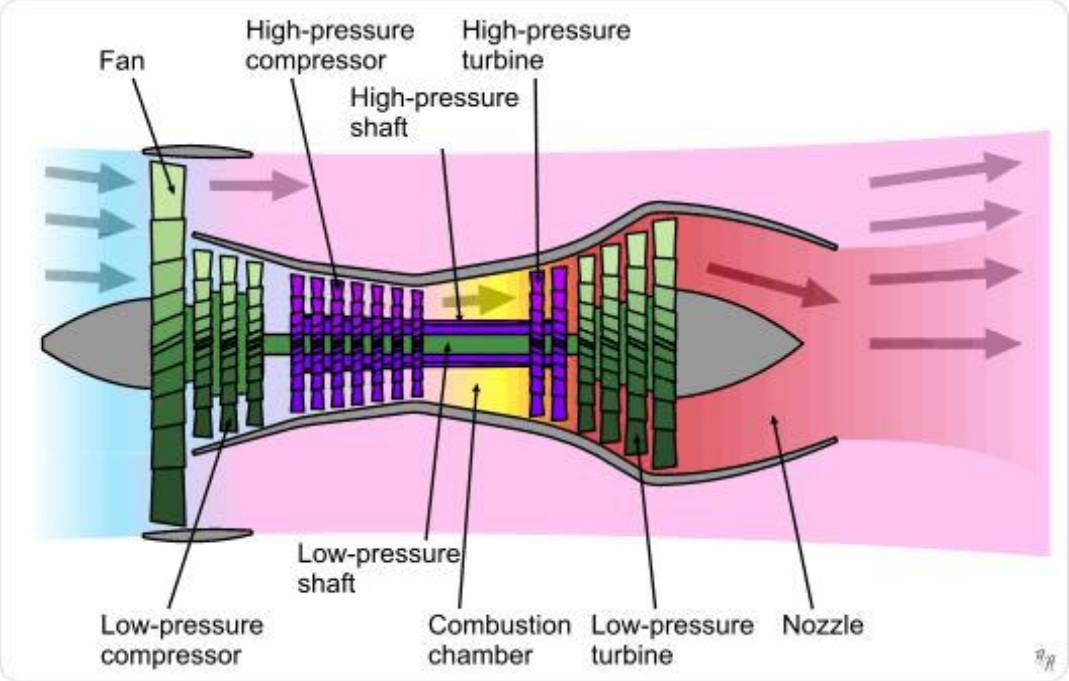
4.6.2 Igniting fuel/Air mixture✓ before TDC✓ (2)

4.7 Supercharger used to pump more air into cylinders✓ due to decrease in density of air and increase in altitude✓ (2)

[20]

QUESTION 5

5.1



(Sketch: 3 marks; labels: 9 marks) (12)

5.2
- Intake stroke✓ – air enters at ambient pressure and constant, then leaves intake at increased pressure and decrease in volume✓
- Compression✓ – air✓ leaves compressor with large increase in pressure and decease in volume✓
- Expansion✓ – takes place by burning fuel which expands air by heat.✓ Expanding gasses move rearward to drive turbine✓
- Exhaust✓ –convergent duck✓ converts expanding volume to final high velocity✓ (4 × 2) (8)

[20]

QUESTION 6

6.1 Helicopter – no propeller to produce forward thrust, relies on rotor for lift and thrust
Gyroplane – conventional propeller empennage and stub wings

6.2 Helicopter – can take off and land vertically
Gyroplane – requires short run for take off

6.3 Helicopter – main and tail rotors for normal flight
Gyroplane – rotor is not driven by engine. Conventional propeller produces forward thrust

6.4 Helicopter – can fly sideward, hover and turn 360°
Gyroplane – cannot hover, climb vertically, or fly sidewards

6.5 Helicopter – rotor tilted backwards
Gyroplane – rotor tilted forwards

(5 × 2) **[10]**

QUESTION 7

7.1
- Fuel inlet
- Needle and seat
- Float
- Throttle butterfly
- Venturi
- Jet
- Discharge nozzle

(Any 6 × 1) (6)

7.2
- Fixed pitch propeller
- Adjustable pitch propeller
- Ground adjustable propeller
- Controller pitch propeller
- Constant-speed propeller
- Automatic pitch propeller
- Reverse pitch propeller

(Any 4 × 1) (4)
[10]

QUESTION 8

8.1
- Issuing of airworthy certificate
- Issuing safety certificate
- Ensuring safety of crew and passengers
- Declaring aircraft serviceable at all times
- Restricting corrosion
- Ensuring enough fuel for duration of flight
- Preventing defects from reoccurring
- Determining defects from occurring and servicing of defects (Any 4 × 1) (4)

8.2
- Safety of system
- Full and free movement
- No binding
- Correct routing
- Correct travel up and down
- Correct synchronisation
- All safety devices in place
- Correct alignment (Any 4 × 1) (4)

8.3
- Weight
- Lift
- Thrust
- Drag (4)

8.4
- Parasite drag
- Profile or form drag
- Skin friction
- Induced drag
- Wing tip or trailing edge vortices (Any 3 × 1) (3)

[15]

TOTAL: 100