higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MOTOR TRADE THEORY N2

24 November 2022

This marking guideline consists of 6 pages.

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QUESTION 1

1.1	1.1.1	C✓		(1)
	1.1.2	C✓		(1)
	1.1.3	D✓		(1)
	1.1.4	C✓		(1)
	1.1.5	B✓		(1)
	1.1.6	A✓		(1)
	1.1.7	A✓		(1)
	1.1.8	B✓		(1)
	1.1.9	A✓		(1)
	1.1.10	B✓	(10 × 1)	(10)

1.2
A - Battery ✓
B- Switch or Ignition Switch ✓
C- Field Coil✓
D – Brushes ✓
E- Commutator ✓ (5)

1.3	1.3.1	TRUE✓		
	1.3.2	TRUE✓		
	1.3.3	FALSE✓		
	1.3.4	TRUE✓		
	1.3.5	FALSE✓		
			(5 x 1)	(5)

[20]

QUESTION 2

2.1
A – Axle housing ✓
B – Pinion gear ✓
C – Halfshaft ✓
D – Sideshaft flange✓
E – Crownwheel✓
F – Differential carrier✓ (6)

2.2 The Differential carrier is bolted to the crown wheel. ✓ Two planetary gears are mounted onto the differential shaft. ✓ The two planetary gears are in constant meh with two side gears. ✓ that are splined to the side shafts. ✓ (4)

2.3	2.3.1	footbrake✓
	2.3.2	fluid✓
	2.3.3	Wheel cylinders✓
	2.3.4	drum✓
	2.3.5	force✓

(5)

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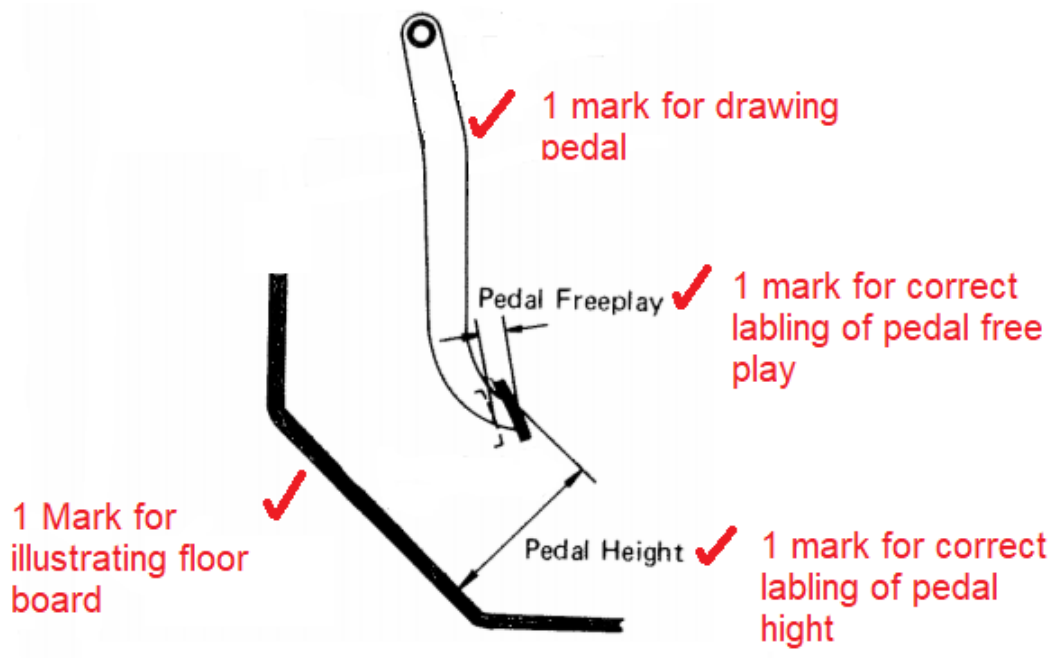
2.4 To prevent corrosion of metal components in the hydraulic system.
To maintain the braking efficiency of the system.
To maintain its viscosity.
To prevent rubbers from swelling. (any two answers) (2)

2.5
- Low beam system
- High beam system
- Park light system
- Daytime running lights (any other correct applicable answers) (4)

[21]

QUESTION 3

3,1



(4)

3.2
- Allows the vehicle to start without it moving
- Allows the vehicle to come to a stop without switching off the engine.
- To transmit torque smoothly from the engine to the gearbox.
- Allows smooth gear changing.
- Must be able to handle loads. (any one answers) (2)

3.3. 3.3.1
- Cheaper to manufacture✓
- Easy to replace✓
- No maintenance required✓

(any 1 correct answer) (1)

3.3.2.
- Lighter and easier to control✓
- Fewer moving parts✓
- More compact system✓ (any one correct answer) (1)

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3.4. - Better fuel economy
- More interior space
- Better traction
- Lighter in mass
- Cheaper to build and produce (any three answers) (3)

3.5 A – Upper ball joint ✓
B – Lower ball joint✓
C – Lower control arm ✓
D – Anti-roll bar✓ (6)
E – Shock ✓
F– Coil spring **[17]**

QUESTION 4

4.1 4.1.1 It is the angle of the pivot line relative to the vertical line of the wheel (2)

4.1.2. It is the angle formed between the SAI and the camber angle. (2)

4.1.3 It is the angle the wheels make with respect to the vehicle centreline when viewed from above. (2)

4.2 When the front wheels turn in too sharply and the vehicle continues in a straight direction. (2)

4.3 - The selector pushes the synchro towards the gear.
- The sleeve, synchro ring and dog clutches moves toward the gear.
- The blocker ring rotates with the gear and prevents the dog clutches from meshing.
- When the gear speed and the synchro reach the same speed the dog clutches engage without grating.
- The gear is now locked to the synchro unit and output shaft. (5)

4.4 • Closer gear ratios
• Improved acceleration
• Theoretical higher top speeds
• Better fuel economy✓ (any two answers) (2)

4.5 4.5.1. Worn/damaged gear teeth
Worn needle roller bearings ✓ (2)

4.5.2. Driver: Driven (1)
1: 2

4.6 Ball roller bearings
Needle roller bearings
Thrust bearings (any two answers) (2)
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QUESTION 5

5.1
- High float level (flooding)
- Incorrect idle mixture (CO) adjustment
- Choke system stuck in active position
- Throttle valve adjustment incorrect
- Idle speed too high
- Dirty/blocked filters (any four correct answers) (4)

5.2
- Air Filter –
  - Prevents dirt and dust entering into the engine.
  - Serves as a flame arrester when the engine backfire
  - Reduce noise.
- Throttle position Sensor
  - The angel at which the sensor is opened, determines the amount of air that will flow into the engine cylinders.
- Throttle Positioning Sensor.
  - Senses the angle of the throttle and provide the information to the ECU.
- Idle Speed Control Valve.
  - The idle speed is controlled by the ECU, through the ISC valve.
  - Regulate the idle speed by, by adjusting the volume of air that enters through the throttle position sensor to provide cold start and fast idle conditions.
- Manifold absolute pressure sensor.
  - The MAP Sensor meters and measure air intake volume.
  - Measures engine load.
- Mass airflow meter.
  - Measures engine load conditions.
  - Provide information to the ECU, to calculate fuel requirements according to the engine load conditions.

(any two correct answers) (4)

5.3
- very accurate in dispensing fuel
- atomises fuel into a mist
- simple construction with few moving parts
- does not require maintenance or adjustments (any two answers) (2)

5.4.
A – High voltage output✓
B – positive/negative terminal✓
C – Primary winding/coil✓
D – Centre core✓
E – Secondary winding/coil✓
F – positive/negative terminal✓ (6)

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5.5 5.5.1
- Engine pinging
- Idling speed high
- High fuel consumption (any two answers) (2)

5.5.2
- Hard starting
- Poor performance
- High fuel consumption (any two answers) (2)

5.6
- Sensors detect the engine operating conditions, such as the engine speed, engine temperature and inputs the information to the ECU.
- Actuators receive information on engine condition from the ECU, the actuators adjust the quantity of fuel and air, ensuring that the correct fuel to air ratios are maintained for efficient operation under different conditions. (2)

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TOTAL MARKS: 100

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