MARKING GUIDE (MOCK 2026)

5150, Basic Vehicle Technology (Paper 1 & 2)

Subject code: 7130 (Basic Vehicle Technology 1)																	
Question N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Answer	C	D	A	D	C	D	B	D	A	A	D	A	B	B	A	A	D
Question N°	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Answer	A	C	A	C	C	C	D	D	A	C	A	A	D	A	A	A	A
Question N°	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
Answer	D	C	D	C	A	B	D	C	B	A	D	C	D	D	D	B	

Subject code: 5150 (Basic Vehicle Technology 2)

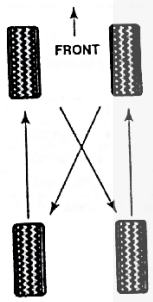
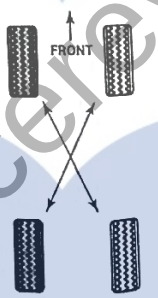
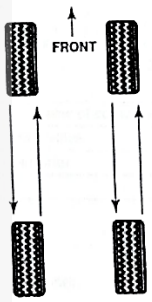
Question 1: SUSPENSION SYSTEM

The figure 1a below illustrates a method of tired rotation.

a- State two (02) consequences that lower than specified tire inflation pressure could lead to. (1mark x 2 = 2 marks)
- Reduced fuel economy; - Reduced tire life; - Increased chances of roadside faults or accidents.

b- List two (02) reasons why tire rotation is essential during service. (1mark x 2 = 2 marks)
- To ensure long life; - Equilibrate tire wear.

c- Reproduce figure 1b. Twice and demonstrate two (02) recommended methods of tire rotation. (1mark x 2= 2 marks)

Method 1	Method 2	Method 3
		

d- What type of suspension is in figure 1c? (1 mark)
Independent rear wheel suspension.

e- Identify the parts labelled a, b, c, d, f, g, h and j in figure 1c above. (2 marks)

Ref.	**Name** (0.25mark x 4)	**Ref.**	**Name** (0.25mark x 4)
A	Upper control arm	F	Shock absorber
B	Upper bolt join	G	Coil spring
C	Knuckle	H	Strut rod
d	Stabilizer bar and rod assembly	j	Lower control arm shaft and bushing

f- Give the function of the torsion bar in figure 1c above. (1 mark)
It stabilizes the vehicle (by preventing rolling) in the turns and on the jolly roads.

g- Outline one disadvantage of a solid axel support over an independent rear axle. (1 mark)
- A solid supports the springs, so the axle and suspension components are unsprung weight. When one wheel rides over a bump, the force of impact transfers through the solid axle to the opposite side, to unstable handing;
- Side-to-side road shock transference; - Poorer tire adhesion.

Question 2: AIR CONDITIONING SYSTEM

The figure 2 below represents the air conditioning system of a Toyota Avensis.

a- What is the function of the air conditioning system? (1 mark)
It allows the temperature of the cabin to be controlled to the ideal or most comfortable value.

b- Name the refrigerant mostly used now our days in air conditioning system. (1 mark)
Refrigerant R134a.

c- State three (03) means through which heat can be transferred. (0.5mark x 3 = 1.5 mark)
- Radiation; - Conduction; - Convection modes.

d- Explain how heat is evacuated from the vehicle during hot climatic condition. (2 marks)
Heat is radiated into a refrigerant flowing in the evaporator and the refrigerant carries the heat to the condenser.

e- Give the name of parts numbered 1, 2, 3, 4 and 5 (1.25 mark)

Ref.	**Name** (0.25mark x 3)	**Ref.**	**Name** (0.25mark x 2)
1	Compressor	4	Expansion valve
2	Condenser	5	Receiver drier
3	Evaporator		

f- What is the function of the expansion valve? (1 mark)
It controls the pressure of refrigerant entering the evaporator.

g- Explain why the condenser is placed at the grille of the front bonnet. (0.5 mark)
So that, it will have direct contact with cold atmospheric air.

h- Identify where the evaporator is located on the vehicle and describe how the conditioned air is transferred to the occupants of the vehicle. (0.5mark + 1.25mark = 1.75 mark)
It is located in the instrument panel and there is air duct on the vehicle that direct the flow of cold air to the occupants at specific positions.

Question 3: EXHAUST SYSTEM

The figure 3 below represents an exhaust system.

a- Identify the parts numbered 2, 3, 4 and 5 in figure 3 above. (1 mark)

Ref.	**Name** (0.25mark x 2)	**Ref.**	**Name** (0.25mark x 2)
2	Resonator	4	Catalytic converter
3	Muffler or silencer	5	O_2 sensor

b- Give two (02) functions of the exhaust system. (1mark x 2 = 2 marks)
- It controls the sound of exhaust gases; - It directs the exhaust gases away from the passengers;
- It converts harmful gases.

c- List two (02) effects of a cracked exhaust pipe. (1mark x 2 = 2 marks)
- Excessive engine noise; - It reduces engine power; - It emits pollutants.

d- In not more than seven (07) points, describe the dismounting procedure of the exhaust manifold. (5 marks)
- Disconnect the battery; - Remove engine carter;
- Remove engine components in relation with the exhaust manifold; - Remove the heat shield;
- Remove the manifold from the cylinder head; - Remove the manifold from the exhaust pipe.

Question 4: VEHICLE STRUCTURE

The figure 4 below represents an integral body chassis construction vehicle.

a- Define integral chassis body construction. (1 mark)
It design such that the floor pun and all the body panel are bonded together to form one complete structure.

b- State two (02) advantages of this type of construction. (1mark x 2 = 2 marks)
- Better safety to passengers; - Better collision properties; - Reduction of weight;
- Low cost of production; - Stress of chassis evenly distributed.

c- Identify the parts numbered 1, 2, 3, 4, 5, 6, 7 and 8 in figure 4 above. (2 marks)

Ref.	Name (0.25mark x 4)	Ref.	Name (0.25mark x 4)
1	Front bumper	5	Rear window
2	Posh panel	6	Seat pan
3	Windscreen rail	7	Center pillar
4	Roof panel	8	Windscreen

d- What is the use of a sub-frame in this construction? (1 mark)
It is used to carry the engine and the gear box.

e- Cite two (02) forces that chassis frame must resist. (1 mark)
- Centrifugal force; - Bonding stress/forces;

f- Give the function of the front bumper and the windscreen rail. (0.5mark x 2 = 1 mark)

- Front bumper: It reduces or prevent physical damage to the front in low speed washes.
- Windscreen rail: It allows a good mounting position of the windscreen and guides it in a safe position during Mounting.

g- In not more than three (03) lines, give the order to mount the vehicle system back on the structure after body work repairs (suspension, transmission, engine, steering, brake, light and auxiliary) system respectively. (2 marks)
Mount the engine, the transmission, the steering, the suspension, the braking system, the lighting and auxiliary components.

Question 5: STEERING SYSTEM

The figure 5 below represents a steering system.

a- What type of steering system is indicated in figure 5 above? (0.5 mark)
Power assisted steering system.

b- Give the function of the steering system. (1 mark)
It converts rotational movement of the steering wheel into translational movement.

c- Identify the parts labelled 1, 2, 3 and 4 in figure 5 above. (2 marks)

Ref.	Name (0.5mark x 2)	Ref.	Name (0.5mark x 2)
1	Steering knuckle	3	Power steering pump
2	Fluid reservoir	4	Steering box

d- What are the functions of the reservoir, the steering pump and the power ramp? (0.5mark x 3 = 3 marks)

- Reservoir: It store steering fluid used in the steering system.
- Steering pump: It uses steering fluid to boost the driver's effort at the level of the steering wheel.
- Power ramp: It generates pressure that pushes the rack.

e- Name four (04) types of steering gearboxes. (0.5mark x 4 = 2 marks)
- Worm and wheel steering gear; - Cam and double roller steering gear; - Worm and nut steering gear;
- Rack and pinion steering gear; - Recirculating ball type steering gear.

f- Define terms "Under-steer and Over-steer". (1mark x 2 = 2 marks)

- Under-steer: When the rear slip angle is greater than the front slip angle, the vehicle tends to move away from the direction of the side force. This is known as over steer and is advantageous when the vehicle is moving on roads having many bends and curves.
- Over-steer: When the front slip angle is greater than the rear slip, the vehicle tends to steer in the direction of side force. This is called under steer. This provides greater driving stability especially when there is a side wind.

g- Where do you adjust toe on the steering system in figure 5 above? (1 mark)
On the tie rod.

SECTION B
ELECTRICAL TECHNOLOGY
(Answer any TWO questions from this section)

Question 6: LIGHTING SYSTEM

Figure 6a and 6b below show two different types of head lamps.

a- Give the main difference between interior and exterior lighting systems. (2 marks)
Interior lighting is made in illuminate the vehicle compartment or cabin, while the exterior lighting systems are to illuminate so that the driver can see and inform other road users on the presence and intensions of the driver.

b- Why it is important to avoid touching a halogen bulb with your fingers? (2 marks)
The oils from your fingers can cause unequal heating of the glass during operation, leading to a shorter-than-normal service life.

c- Identify the types of head lamps on figure 6a and 6b above. (0.5mark x 2 = 1 mark)
- Figure 6a: Sealed beam headlamps.
- Figure 6b: Composite head lamps.

d- After spraying the car, the leases of the head lamps were covered with sprayed paint.
i) What would have caused this abnormality? (0.5 mark)
Poor or turn masking.

ii) List two (02) consequences to the lighting system. (0.5mark x 2 = 1 mark)
- Poor light rays; - Nasty look of head lamps.

iii) How can this abnormality be remedied? (1 mark)
Use the solvent or petrol fuel to clean the screen.

e- Explain the reason why most vehicle return wires are connected on the chassis of the vehicle. (1.5 mark)
This is to reduce the number of cables used in wiring electrical circuits of the vehicle. Furthermore, it will reduce the cause of buying more electrical cables.

f- State one (01) reason why stranded wires are mostly used on automobile electrical circuits. (1 mark)
Stranded wire used because it is very flexible and has less resistance than solid wire.

Question 7: WINDSCREEN WIPER

Figure 7 below shows the windscreen wiper of a vehicle.

a- State the function of a windscreen wiper. (1 mark)
- It is a device that is used to clean water, snow or mud from the windscreen of the vehicle;
- It cleans the windshield of the car at the front and rear.

b- Identify the parts numbered 1, 2, 3 and 4 in figure 7 above. (1 mark)

N°	**Name** (0.25mark x 2)	N°	**Name** (0.25mark x 2)
1	Wiper arm	3	Wiper motor
2	Link rod	4	Connecting linkage

c- Give the function of the wiper arm and the wiper motor. (1mark x 2 = 2 marks)
- Wiper arm: It receives the movement of wiper motor through the connecting linkage to control the blades.
- Wiper motor: It transforms the electrical energy into mechanic energy to control the blades.

d- Name the three (03) main types of wiper in figure 7 above. (0.5mark x 3 = 1.5 mark)
- Conventional; - Flat; - Hybrid.

e- Explain the operation of the windscreen wiper in figure 7 above. (2 marks)
When the windscreen wiper switch is on, the current from the battery is supplied to the wiper motor. Then the motor turns and transmits motion of the wiper motor to the wiper arm at relates then the blades will clean the windscreen.

f- State the consequence if the links of the windscreen wiper is broken. (0.5 mark)
- The wiper blade will not operate; - The blade mechanism will not function while the motor is turning..

g- Before work was done on the car body, the wipers were cleaning the screen perfectly, but after body work, the cleaning became imperfect. List two (02) possible causes of this abnormality. (1mark x 2 = 2 marks)
- The electrical cables are disconnect; - The motor is faulty; - The wiper arms are stocked.

Question 8: STARTER MOTOR

Figure 8 below shows a starting system of a vehicle.

a- State the function of the starting system of a vehicle. (1 mark)
It is used to crank the flywheel for starting purpose.

b- What voltage is required for starting a car engine? (1 mark)
12.2 Volts minimum.

c- Referring to figure 8 above, name the following parts 1, 2, 3 and 4. (2 marks)

Ref.	**Name** (0.25mark x 2)	**Ref.**	**Name** (0.25mark x 2)
1	Ignition switch	3	Battery
2	Solenoid	4	Starter motor

d- Give the function of a battery and a starter motor. (1mark x 2 = 2 marks)
- Battery: It supplies electrical energy to the stater motor.
- Starter motor: It generates mechanical energy that is used to crank the engine.

e- Cite two (02) positions where the starter switch can be located in the vehicle. (0.5mark x 2 = 1 mark)
- Steering column; - On the dashboard.

f- You are to dismount a starter motor. List cables you will disconnect before dismounting the starter motor. (3 marks)
- The positive cable connecting the battery and starter motor;
- The negative cable connecting the cylinder block;
- The ignition switch cable connected to terminal 50 of the solenoid.
