

## Skill name

## Automobile Technology

## Criteria

## Mark

A	Engine Management	15.00
B	Engine Tune	15.00
C	Body Electrical	15.00
D	Electrical	15.00
E	Brakes	10.00
F	Wheel Alignment and Steering	10.00
G	Engine Test	10.00
H	Engine Measurement	10.00
I		

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
A1	ENGINE MANAGEMENT	M	No damage caused to the vehicle	
		M	No damage caused to equipment or tools	
		M	Clean and tidy workstation when finished work	
		M	Battery + (Starter Lead Insulated)	
		M	Ground removed from transmission case	
		M	Open circuit on Blue wire from Fuse H to 91 E105	
		M	Resistance between Throttle valve Signal 2 and Throttle valve Gr	
		M	Faulty Camshaft Position Sensor	
		M	Positive line to Fuel Pump Short	
		M	Spark Plug Cylinder 1	
		M	Terminal 72 of IPDM plug F115 moved to position 73	
		M	Measure battery voltage	
		M	Check fuse link H	

		M	Measure supply voltage to terminal 1 on ignition switch	
		M	Measure voltage terminal 50 (S)	
		M	Check manual for symptom diagnosis procedure	
		M	Inspect fuse for fuel pump	
		M	Check supply and ground to fuel pump	
		M	Measure supply voltage to IPDM	
		M	Competitor shows a minimum of 4 correct problem areas on the	
		M	Measure supply voltage to ignition coils	
		M	Measure supply voltage to injectors	
		M	Replace the inlet manifold correctly and torque bolts	
		M	Identifies no electrical connection between battery positive clamp	
		M	Identifies location of injector supply wire (SB) in incorrect position	
		M	Identifies open circuit between fuse H and terminal 91 E105	
		M	Identifies voltage drop between B- and starter body as fault	
		M	Identifies camshaft position sensor as faulty	
		M	Identify no gap between spark plug electrodes as cause of misfire	
		M	Remove tape between B+ and starter main positive lead and rep	
		M	Reconnect ground lead to engine/transmission assembly	
		M	Replace Camshaft Position Sensor to correct tightening torque	
		M	Replace spark plug to correct tightening torque	
		J	Fuel Pump circuit short diagnosis	0 1 2 3
		J	Testing process for TPS, Page EC 62	0 1 2 3
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
B1	ENGINE TUNE	M	Inserted exhaust gas filter	

M All activities completed within given time  
 M Make sure engine has conditions to run  
 M Vehicle identification  
 M Management system  
 M Engine Code  
 M Correct scope pattern O2 Sensor 1  
 M Correct scope pattern O2 Sensor 2  
 M Throttle Position Sensor VOLTAGE  
 M Manifold Absolute Pressure Sensor  
 M Engine Coolant Temperature Sensor RESISTANCE  
 M Intake Air Temperature Sensor VOLTAGE  
 M N°1 Injector VOLTAGE  
 M Test the new 10 amp fuse with ohmmeter  
 M Print the gas emissions report  
 M Found a faulty Injector  
 M Found the fault of Idle Speed Control actuator  
 M Found the fault of Purge Control Solenoid Valve  
 M Found the fault of O2 Sensor 1  
 M Found the fault of O2 Sensor 2  
 M Found the fault of Throttle Position Sensor  
 M Found the fault of Manifold Absolute Pressure Sensor  
 M Found the fault of Engine Coolant Temperature Sensor  
 M Found the fault of Intake Air Temperature Sensor  
 M Clear the codes after the problem is fixed  
 M Locate/Replace missing Relay  
 M Locate/Replace incorrect amperage and blown fuse  
 J Prepare and maintain a safe, tidy and efficient work station

0  
 1  
 2  
 3  
  
 0  
 1  
 2  
 3  
  
 0  
 1

J Read and interpret technical data

J Direct and face to face communication

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
C1	BODY ELECTRICAL	M	No damage on vehicel or tools	2
		M	Calibrating	3
		M	Protection	
		M	Door switch front left side	
		M	Charging indicator bulb broken	
		M	Charging control on alternator Volt/Amp	
		M	Remote dooropening with key	
		M	Checking of reference voltage and voltage drop on batteri	
		M	Headlights Hi/low beam incoorect	
		M	Headlights Hi/low beam incoorect	
		M	Front position light no function	
		M	Front position light no function	
		M	Wiper no function	
		M	WiperHi/low speed not working coorect	
		M	Wiper stop position incorrect	
		M	Trunk compartment light	
		M	Horn no function	
		M	Horn no function	
		M	Power windows; no function left/ right side	
		M	Stop light right handside	
		M	Licens plate light no function	
		M	High position stop light weak	
		J	Report sheet correctly filled	0
				1
				2
				3

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
D1	ELECTRICAL	M M	wiring up the Consulab leave the station as found (C has to do it by his own) fill out the report sheet correctly - situation 1 fill out the report sheet correctly - situation 2 fill out the report sheet correctly - situation 3 Fault 1 - power supply Fault 2 - fuse F9 Fault 3 - F3 Fault 4 - F8 Fault 5 - F1 Fault 6 - F2 Fault 7 - F10 Fault 8 - F5 Fault 9 - F6 Fault 10 - fuse F10 checking power supply after wiring up (first measurement) correctly using of measurement instruments reseting the Ohmmeter before first use reset resistance reset fuse	
E1	BRAKES	M M M M M	visually checked for leakage find the wrong brake hose replace the right brake hose tighten all screws with the correct torque check the vacuum system	

- M find the valve defect and replace it and re-check
- M measure the quality of brake fluid
- M replace the brake fluid
- M Measure the thickness of front discs and get right selection
- M Runout of the front left disc and get right selection
- M Runout of the front right disc and get right selection
- M Measure the brake drum and get right selection
- M Roundness of brake left drum
- M Roundness of brake right drum
- M Measure the rear brake shoes lining thickness
- M remove the caliper and piston correctly
- M correct mounting of the seal kit and piston without damage
- M mounting the caliper and replace the seal ring for hose
- M tighten the caliper screws with the correct torque
- M tighten the screws of brake hose with the correct torque
- M remove the rear brake shoes in the correct order
- M check the rear brake cylinder for leakage
- M replace the rear cylinder and clean the system with torque
- M mounting the rear brake shoes correctly with the correct grease
- M adjust the rear brake shoes
- M bleeding the brake system only once at this side
- M use the tank for brake fluid
- M wearing gloves and glasses if necessary
- M not damage the simulator and tools clean the workplace
- M not touch critical parts with brake fluid

Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
F1	WHEEL ALIGNMENT & STEERING	M M M M	Personal protection used when required Correct use of tools, and no damage to tools and vehicle Clean Workstation throughout task time Communicates following faults to the Expert (shows by hand)	

- M Prints alignment report sheet
- M Confirms proper positioning of vehicle on four post lift
- M Fits all targets correctly to the wheels as per marking on them
- M Observes front right toe value out of specs
- M Adjusts front right toe as per specs
- M Observes rear right wheel camber out of specs.
- M Checks all 4 tires for improper air pressure and wear.
- M Finds front left tyre pressure low. Correctly fills air as per specs
- M Finds dust cover of rear right wheel missing. Fits the same.
- M Checks all 4 road wheels for runout, Wheel bearing axial end play
- M Checks operation of all 4 shock absorbers, Finds rear left shock a
- M Checks each mounting part of axle and suspension for looseness
- M Finds lower bolt of rear right shock absorber loose & tightens the
- M Finds front left stabiliser connecting rod bent
- M Finds steering gear box mounting bolts on front suspension mem
- M Finds spring of rear left suspension out of position.
- M Checks each of suspension member, strut and transverse link fo
- M Finds front right lower arm ball joint rubber cracked
- M Measures Vehicle height correctly.
- M Replaces rear left shock absorber with new one
- M Asks for new piston rod lock nut and applies correct torque (half
- M Replaces front left stabiliser connecting rod with new one and ap
- M Replaces front right lower arm with correct torque and new nut
- J Used four post lift taking all safety precautions

0  
1  
2  
3  
0

- J Used Fender Covers , internal covers & Exhaust filter



		J	The competitor works in a safe manner	3
				0
				1
				2
				3
		J	The competitor correctly installs the timing belt	0
				1
				2
				3
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score
H1	ENGINE MEASUREMENT	M	Engine disassembly, measurement and assembly completed with	
		M	Check engine free rotation	
		M	CYLINDERHEAD	
		M	CYLINDERHEAD	
		M	CYLINDERHEAD	
		M	CAMSHAFT	
		M	ENGINE BLOCK	
		M	CRANKSHAFT	
		M	CRANKSHAFT	
		M	Cylinder head assembly FAULT	
		M	Cylinder head assembly FAULT	
		M	Cylinder head assembly FAULT	
		M	Cylinder head assembly FAULT	
		M	Cylinder head assembly FAULT	
		M	Cylinder head assembly FAULT	

M	Engine block assembly Fault	
M	Engine block assembly Fault	
M	Engine block assembly Fault	
M	Engine block assembly Fault	
M	Engine block assembly Fault	
M	Engine block assembly Fault	
M	Engine block assembly Fault	
J	The competitor works in an organized manner and uses special t	0 1 2 3
J	The competitor works securely and safely	0 1 2 3
J	Disassembling of the Engine	0 1 2 3
J	NUMBER 1 CYLINDER VALVES, VALVE GUIDE AND VALVE S	0 1 2 3
J	CYLINDER BORE Measurement NR 2	0 1 2 3
J	CYLINDER BORE Measurement NR 4	0 1 2 3
J	PISTON and RING CYLINDER NO. 1	0

		J	PISTON and RING CYLINDER NO. 3	1 2 3 0 1 2 3
		J	CRANKSHAFT BIG END JOURNAL PISTON NO. 3	0 1 2 3
		J	CRANKSHAFT MAIN JOURNAL NO. 4 FROM FRONT	0 1 2 3
		J	Cylinder head assembly	0 1 2 3
		J	Engine Block assembly	0 1 2 3
Sub Criteria ID	Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect - Description	Judg Score



Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
		1	0.25
		1	0.25
		1	0.25
Recorded no electrical connection between B+ and starter		2	0.25
Recorded no ground connection to transmission assembly		2	0.25
Recorded open circuit on Blue wire from Fuse H to terminal		2	0.25
Recorded 330 Ohm resistance between Throttle valve Signal		2	0.25
Recorded faulty Camshaft Position Sensor		2	0.25
Recorded short to ground on supply to fuel pump between		2	0.25
Recorded no gap in spark plug electrodes		2	0.25
Recorded that the light blue wire is located in the incorrect		2	0.25
		3	0.25
		3	0.10

Criterion A      Total Mark      15.00



		1	0.30
Oil level; Coolant level; Battery voltage		2	1.00
Brand and Model	Hyundai-Accent 1.6	3	0.10
System	Bosch M.7.9.8	3	0.10
	G4ED	3	0.10
Correct range on both axis (X & Y)	0V	3	0.20
Correct range on both axis (X & Y)	0.1V	3	0.20
Correct range on both axis (X & Y)	0V	3	0.30
Correct range on both axis (X & Y)	2.5V – 3.0V	3	0.30
Correct range on both axis (X & Y)	0.50 – 0.60KOhms	3	0.30
Correct range on both axis (X & Y)	3.0V – 3.5V	3	0.30
Correct range on both axis (X & Y)	3.5V – 3.9V	3	0.30
		3	0.50
HC; CO;CO2; O2; Lambda		3	0.30
Cylinder 1	Open Circuit at pin	4	0.60
Open circuit between PCM and idle speed control actuator	Pin 22 at PCM 3.8	4	0.60
Open circuit between PCM and purge control solenoid valve	Pin 8 at PCM 0V	4	0.60
Low value (lean mixture)	Pin 35 at PCM 0.1	4	0.50
Low value (lean mixture)	Pin 13 at PCM 0.1	4	0.50
TPS sensor signal input to PCM	Pin 75 at PCM 0V	4	0.60
MAP sensor signal input to PCM	Pin 10 at PCM 2.8	4	0.60
ECT sensor signal input to PCM	Pin 77 at PCM 0.55	4	0.60
IAT sensor signal input to PCM	Pin 22 at PCM 3.4	4	0.60
Everytime he asks to repair the fault		4	0.80
Main relay (ECM)	locate in the Wiring	5	0.50
30 amp. Fuse instead of 10 amp.	locate in the Wiring	5	1.00
When the engine is running		1	1.00
No preparation; No safety; no cleaning;			
Check tools & equipment; minor damages; try to clean			
Check tools & equipment; no damages; clean area			
Check tools & equipment; very careful with equipment; clean		2	1.00
No data reading			
tries to read schematics and tech data			
read and interpret well the tech data and schematics			
uses more than one source of data and compares it		2	1.00
does not greet the experts (in any manner)			
he greets, looking at expert, and sympathetically			

very easy communication and full of attention  
 Promotes direct communication and look in to expert face

Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
Calibrating multimeter before first use		1	0.50
Using appropriate protection when necessary, car and per		1	0.50
Open circuit,give competitor a new to install/Correct wiring		1	0.50
Do not repair/Correct wiring diagram used fault circeld on		2	0.60
correct measuring of Voltage/Amp with multimeter		2	0.60
Not working no battery in key/Give the competitor the sec		3	1.00
Checking resistans on both ground and supply		3	1.00
Cabels for high/low switched on boot sides/Do not repair, v		3	0.40
Correct wiring diagram used for diagnosis/ component circ		3	0.60
Short circuit to ground blow fuse 46 incoorect fuse 7amp/0		4	0.50
Correct wiring diagram used fault circeld on paper diagram		4	0.70
Fuse 56 30 amp on IPDM blown /repair		4	0.60
,Switch position on pin 1 and 2 on wiper motor/ Do not rep		4	0.80
Front wiper position signal pin 4 removed/ Do not repair		4	0.40
Bridge between pin 2,3 light always on/Correct wiring diag		4	0.60
Correct wiring diagram used fault circeld on paper diagram		4	0.60
Fuse nr 32 correct10 amp blown, Relay faulty no connecti		4	0.80
Ground pulled out passenger side A frame bolt removed/C		4	1.00
Voltage drop 24volt bulb installed/Correct wiring diagram u		4	0.60
Broken bulb, give competitor a new/Correct wiring diagram		5	0.60
Bulb is not in right position/ repair to correct position		5	0.60
The order how to proceed with repair so that car is road sa		5	0.60
Not starting with charging system		2	1.00
Beginning with chargingssystem and goes on with the exter			
Beginning with chargingssystem and goes on with the exter			
Repair is done in right order			

Criterion C Total Mark 15.00

Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
		1	0.40
		1	0.35
		2	0.50
		2	0.50
		2	0.50
		3	1.00
		3	0.85
		3	1.00
		3	1.00
		3	1.00
		3	1.00
		3	1.00
		3	1.00
		3	1.00
		3	1.00
		3	0.85
		4	1.00
		4	1.00
		4	0.30
		5	0.40
		5	0.35
Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
broken hose ;Model 2		4	0.50
		4	0.40
29Nm bolts M8, 30Nm caliper new gaskets Model 1		5	0.20
		2	0.20
		4	0.40

Criterion D Total Mark 15.00

Criterion E Total Mark 10.00



- lower bolt of rear right shock absorber loose			
- front left stabiliser connecting rod bent			
- steering gear box mounting bolts on front suspension me			
- front right lower arm ball joint rubber cracked			
- turn table not at center of front left wheel			
- lock pin of front right turn table removed			
- front left tyre pressure low			
- rear left suspension spring out of position			
- dust cover of rear right air filling nipple missing			
		2	0.40
Both tyres at the center of the turntable , lock pins of turntable		4	0.20
		5	0.20
Expert to advice repair		4	0.20
		5	0.50
No repairing required		4	0.40
		4	0.20
	33 PSI	4	0.20
Exprt to provide new dust cover.		4	0.20
		4	0.20
Expert to advice replace		4	0.20
		4	0.40
Expert to advice tighten	45 Nm	4	0.20
Expert to advice replace	22 Nm	4	0.20
Expert to advice tighten	46 Nm	4	0.20
No repairing required		4	0.20
		4	0.40
Expert to advice replace front right lower control arm		4	0.20
Measure value under unladen conditions. Fuel, engine code		4	0.20
		5	0.90
	Rear bolt : 45 NmE	5	0.30
22 Nm to both nuts		5	0.30
Bolt in chassis: 50 Nm, Bolt with nut : 34 Nm		5	1.50
		1	0.20
Did not lock both primary & secondary locks. Required re			
Locked primary lift frequently, but not secondary lift			
Almost always locked both primary & secondary lifts			
Always ensured proper locking of both lifts			
		1	0.20
Did not use vehicle covers or exhaust filter			

Used vehicle covers & exhaust filter after some time Used some vehicle covers or exhaust filter Used all vehicle covers before start & exhaust filter before		1	0.20
Did not reset workstation Reset some part of workstation Reset all workstation, but did not clean tools before keeping Reset all workstation with tools cleaned , including wheel a			
Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
		4	0.30
		3	0.30
		3	0.30
		3	0.20
		4	0.50
		2	0.30
		2	0.30
		2	0.30
		2	0.30
		4	0.30
		4	0.30
		4	0.30
		4	0.30
		4	0.50
		4	0.50
		4	0.50
		4	0.50
		4	0.50
		4	0.50
		1	0.50
The competitor`s work is very messy and disorganised, an The competitor`s work is messy with the provided equipme The competitor works carefully with the provided equipme			

Criterion G      Total Mark      10.00

The competitor works very carefully with the provided equipment		1	0.50
The competitor doesn't work safely. No boots, safety glasses			
The competitor works safely. Correct PPE, wears boots, safety glasses			
The competitor works safely. Correct PPE, wears boots, safety glasses			
The competitor works safely. Correct PPE, wears boots, safety glasses		5	2.00
The competitor installs the Timing Belt without the reference marks			
The competitor installed the timing belt with only occasional marks			
The competitor installed the Timing Belt according to all the instructions			
The competitor installed the Timing Belt following every step			
Extra Aspect Description (Meas or Judg) OR Judgement Score Description (Judg only)	Requirement or Nominal Size (Measurement Only)	WSSS Section	Max Mark
		1	0.30
		5	0.05
Measured warp diagonally (2) & longitudinally (2) & short end		3	0.10
Measured cylinder head overall height		3	0.05
cylinder head Serviceable; yes - no ???		2	0.05
Measure intake camshaft lobe height ( measured from the top)		3	0.10
Measure intake camshaft Radial runout		3	0.10
Measure exhaust camshaft lobe height ( measured from the top)		3	0.10
Measure exhaust camshaft Radial runout		3	0.10
Measure the camshaft bearing Clearance		3	0.10
Camshaft Serviceable;		2	0.10
(1)Measure cylinder head warpage diagonally ,(2) longitudinally		3	0.05
Accurate measurement Crankshaft thrust Clearance (+/- 0.02mm)		3	0.10
Accurate measurement Crankshaft Thrust Washers (+/- 0.02mm)		3	0.10
No 1 cylinder valve spring has been extended- is too long		4	0.30
Excessive runout in exhaust camshaft- has bend in centre		4	0.30
No 4 cylinder inlet valve roller rocker has excessive play- r		4	0.30
Hydraulic valve lifter-excessive clearance in cylinder head		4	0.20
Number 1 cylinder valve stem seal damage- spring garter		4	0.30
Inlet camshaft, number 2 bearing in upper support has gro		4	0.30

Criterion H Total Mark 10.00

Number 1 piston first compression ring end gap increased	4	0.30
Number 3 piston, 1st and 2nd compression rings swapped	4	0.30
Number 1 main bearing in lower crankcase has had the lo	4	0.30
Number 5 bearing in the upper crankcase has been chang	4	0.30
Rear main seal faulty- has cut through seal lip.	4	0.30
Number 1 cylinder connecting rod little end bush has exce	4	0.30
Number 3 cylinder top compression ring is seized- has pu	4	0.20
	1	0.40
Messy, disorganised, no care or incorrect use of special to		
The candidate`s work is messy with the provided equipme		
The candidate works carefully with the provided equipmen		
The candidate works very carefully with the provided equip		
	1	0.40
The competitor doesn`t work safely. Safety glasses, glove		
The competitor works safely. Correct PPE, wears boots, s		
The competitor works safely. Correct PPE, wears boots, s		
The competitor works safely. Correct PPE, wears boots, s		
	5	0.30
Did not follow repair manual, they make no reference bef		
Only occasional use of the service manual. The engine is		
The candidate has disassembled the engine according the		
The candidate has disassembled the engine following eve		
	3	0.40
The competitor measured no 1 cylinder valves( 1 intake, a		
The competitor calibrated the tool correctly, measured in		
The calibration of the tool is correct, but no prior cleaning		
Excellent work, calibration ok, measurement ok, surface c		
	3	0.50
The competitor measured the 2 cylinders without the repa		
The competitor calibrated the tool correctly, measured in		
The calibration of the tool is correct, the positioning of the		
Excellent work, calibration ok, measurement ok, surface c		
	3	0.50
The competitor measured the 4 cylinders without the repa		
The competitor calibrated the tool correctly, measured in		
The calibration of the tool is correct, the positioning of the		
Excellent work, calibration ok, measurement ok, surface c		
	3	0.50
The competitor measured the 1 Piston without the repair r		

<p>The competitor calibrated the tool correctly, measured in          The calibration of the tool is correct, the positioning of the          Excellent work, calibration ok, measurement ok, surface c</p>		3	0.50
<p>The competitor measured the 3 Piston without the repair r          The competitor calibrated the tool correctly, measured in          The calibration of the tool is correct, the positioning of the          Excellent work, calibration ok, measurement ok, surface c</p>		3	0.40
<p>The competitor measured the 1 Piston without the repair r          The competitor calibrated the tool correctly, measured in          The calibration of the tool is correct, the positioning of the          Excellent work, calibration ok, measurement ok, surface c</p>		3	0.40
<p>The competitor measured the 1 Piston without the repair r          The competitor calibrated the tool correctly, measured in          The calibration of the tool is correct, the positioning of the          Excellent work, calibration ok, measurement ok, surface c</p>		5	0.30
<p>Assembled without reference to manual.          Assembled sometimes looking at the repair manual no re          Assembled according to the repair manual, Asked for new          Assembled following repair manual, correct lubrication an</p>		5	0.30
<p>Assembled without reference to manual.          Assembled sometimes looking at the repair manual no re          Assembled according to the repair manual, Asked for new          Assembled following repair manual, correct lubrication an</p>			
<p>Extra Aspect Description (Meas or Judg)          OR          Judgement Score Description (Judg only)</p>	<p>Requirement          or Nominal          Size          (Measurement          Only)</p>	<p>WSSS          Section</p>	<p>Max          Mark</p>

Criterion I      Total Mark      0.00

Competition	Total Mark	100.00
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