

# CBSE | DEPARTMENT OF SKILL EDUCATION

## AUTOMOTIVE (SUBJECT CODE 804)

### Blue-print for Sample Question Paper for Class XII (Session 2020-2021)

Max. Time: 3 Hours

Max. Marks: 60

#### PART A - EMPLOYABILITY SKILLS (10 MARKS):

UNIT NO.	NAME OF THE UNIT	OBJECTIVE TYPE QUESTIONS	SHORT ANSWER TYPE QUESTIONS	TOTAL QUESTIONS
		1 MARK EACH	2 MARKS EACH	
1	Communication Skills-IV	1	1	2
2	Self-Management Skills-IV	2	1	3
3	Information and Communication Technology Skills-IV	1	1	2
4	Entrepreneurial Skills-IV	1	1	2
5	Green Skills-IV	1	1	2
TOTAL QUESTIONS		6	5	11
NO. OF QUESTIONS TO BE ANSWERED		Any 4	Any 3	
TOTAL MARKS		1 x 4 = 4	2 x 3 = 6	10 MARKS

#### PART B - SUBJECT SPECIFIC SKILLS (50 MARKS):

UNIT NO.	NAME OF THE UNIT	OBJECTIVE TYPE QUESTIONS	SHORT ANS. TYPE QUES.- I	SHORT ANS. TYPE QUES.- II	DESCRIPTIVE/ LONG ANS. TYPE QUESTIONS	TOTAL QUESTIONS
		1 MARK EACH	2 MARKS EACH	3 MARKS EACH	4 MARKS EACH	
1.	Measuring & service Equipment	6	1	0	1	8
2.	Steering system	6	1	0	0	7
3.	Suspension system	6	0	1	1	8
4.	Transmission and Final Drivesystem	5	1	1	1	8
5.	Automotive Electrical and electronic system	5	1	1	1	8
6.	Motor Vehicle Act and Rules	4	1	0	1	6
TOTAL QUESTIONS		32	5	3	5	45
NO. OF QUESTIONS TO BE ANSWERED		Any 26	Any 3	Any 2	Any 3	
TOTAL MARKS		1 x 26 = 26	2 x 3 = 6	3 x 2 = 6	4 x 3 = 12	50 MARKS

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## AUTOMOTIVE (SUBJECT CODE 804)

### Marking Scheme for Sample Question Paper Class XII (Session 2020-2021)

Max. Time: 3 Hours

Max. Marks: 60

#### General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **24 questions** in two sections – Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **Out of the given (6 + 18 =) 24 questions, a candidate has to answer (6 + 11 =) 17 questions in the allotted (maximum) time of 3 hours.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (30 MARKS):**
  - i. This section has 06 questions.
  - ii. There is no negative marking.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (30 MARKS):**
  - i. This section contains 18 questions.
  - ii. A candidate has to do 11 questions.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.

## SECTION A: OBJECTIVE TYPE QUESTIONS

<b>Q. 1</b>	<b>Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b>	
i.	several benefits of being an active listener are as follows, a. It helps us build connections b. It helps you build trust. c. It helps you identify and solve problems. (Any 2)	1
ii.	Motivation is defined as the drive required to engage in goal-oriented behavior.	1
iii.	It is a condition in which people have an inflated sense of their own importance, a deep need for excessive attention and admiration and lack of empathy.	1
iv.	(c) Both of the above	1
v.	Yes	1
vi.	a) Urban Growers b) Clean Car Engineers	1

<b>Q. 2</b>	<b>Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)</b>	
i.	Air compressor	1
ii.	c. either a or b.	1
iii.	Vane	1
iv.	b. 151 psi to 1,000 psi	1
v.	Manual car washers and Automatic car washers	1
vi.	220V	1
vii.	Camber is the tilt of car wheels from the vertical when viewed from the front of the vehicle.	1

<b>Q. 3</b>	<b>Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)</b>	
i.	a. 0 – 2°	1
ii.	a. To keep the front wheels pointing forward. b. To bring back the wheels in a straight position after a turn.	1

iii.	Steering Gear box	1
iv.	a. The power steering system reduces the number of turns of steering wheel. b. Easy steering while parking, at low speeds or tight turns.	1
v.	d. Re-circulating ball type	1
vi.	Rolling:  When turning or when driving on a bumpy road, the springs on one side of the vehicle expand, while those on the other side contract. This results in body rolling in the lateral (side-to-side) direction.	1
vii.	Yawing:  Yawing is the movement of the car's longitudinal centreline to the right and left, in relation to the car's centre of gravity. On roads where pitching occurs, yawing is also likely to occur.	1

<b>Q. 4</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	Hopping: Hopping is the up and down bouncing of the wheels which usually occurs on corrugated roads while driving at medium and high speeds.	1
ii.	The curvature of each leaf is called nip.	1
iii.	d. Spring steel	1
iv.	Silencer pads are inserted between each of the leaves at their ends to improve the sliding of the leaves against each other.	1
v.	Components of transmission system are as follows: ( any two)  a.Clutch  b.Gearbox  c.Propeller shaft	1
vi.	To allow changes in length of propeller shaft.	1

<b>Q. 5</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	a. Provide a constant permanent speed reduction  b. Turn the drive through 90°	1
ii.	Differential	1

iii.	Balance weight	1
iv.	The speed of the generator at which its output voltage just rises above voltage of the battery being charged is called cutting in speed.	1
v.	The charging system consists of a. Battery b. Ignition switch c. A.C Generator (Alternator) or DC Generator (Dynamo) d. Relay Switch e. Indicator Lamp (Any 2)	1
vi.	Current	1

<b>Q. 6</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	d. All of the above	1
ii.	(a) Throttle Position Sensor	1
iii.	6 months	1
iv.	d) 2 years	1
v.	a) Mandatory signs	1
vi.	d) All of the above	1

## **SECTION B: SUBJECTIVE TYPE QUESTIONS**

**Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks)**

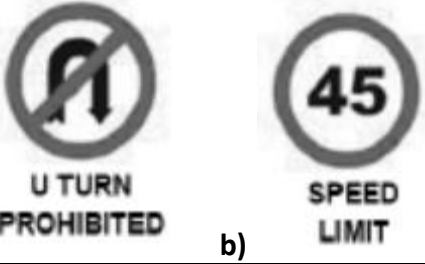
**Answer each question in 20 – 30 words.**

Q. 7	Parts of speech are as follows- (Any 4) a. Verb b. Noun c. Adverb d. Adjective e. Pronoun f. Preposition g. Conjunction h. Interjection	2
Q. 8	a. It increases individual's energy and activity.	2

	<p>b. It directs an individual towards specific goals.</p> <p>c. It results in initiation and persistence of specific activities</p> <p>d. It affects cognitive processes and learning strategies used for completing similar tasks.</p>	
Q. 9	Select Tools menu > Protect document Choose whether to protect Sheet or Document.	2
Q. 10	<p>a. Fear is defined as an unpleasant feeling triggered by the perception of danger, real or imagined.</p> <p>b. It is a fundamental part of human psychology. Our brains are wired to feel fear because it helps us avoid calamity; it keeps us safe. But fear can also hold us back if we let it. Fear feeds on fear, meaning the more we try to avoid something we're afraid of, the bigger and deeper our anxiety grows. To overcome this, we must face our deep-seated misgivings and worries. We have to acknowledge our fears and find ways to move beyond them.</p>	2
Q. 11	<p>a. This problem has come a long way and the probable solution to this has been provided in 4Rs of sustainable development – REFUSE, REDUCE, REUSE &amp; RECYCLE.</p> <p>b. Following these has definitely helped minimize the waste and pollution. But, the recyclers' job at its best is trying to put a full stop to this problem. The concept of upcycling and the avenues it has created for a green market are luring and helps resolve this problem to a great extent.</p>	2

**Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)**

Q. 12	<p>A commonly used car washer has following main parts:</p> <p>a) Electric motor</p> <p>b) Reciprocating water pump</p> <p>c) Water tank</p> <p>d) Spray nozzle</p> <p>e) Flexible water pipe</p> <p>f) Control valve</p> <p>g) Safety valve</p> <p>h) V-belt and pulley</p> <p>i) Pressure gauge</p> <p>(Any 4)</p>	2
Q. 13	<p>Electronic Power Steering System:</p> <p>In electronic power steering, a magnet and a magnet torque sensor are mounted at the end of the steering shaft. The torque sensor senses the amount and direction of turning moment the driver is putting on the steering wheel. By the turning effect the magnet moves. The signal, the strength of which depends on the amount of torque applied on the steering shaft, is sent to an electronic control module (ECM). The ECM sends currents in varying magnitude to the electric motor. The rotation of the motor forces the ball nut to move. This produces a force on the rack. The steering effort is then supplied by the electric motor and the driver is relieved.</p>	2
Q. 14	<p>The functions of propeller shafts are:</p> <p>a. To transmit torque</p> <p>b. To allow different drive shaft angles</p> <p>c. To allow changes in length</p> <p>d. To reduce rotary vibrations</p>	2
Q. 15	<p>Starting system mainly consists of following parts:</p> <p>a. Battery</p>	2

	b. Starter switch c. Starter motor d. Starter drive e. Heavy insulated cables from battery to starter motor f. Ignition switch	
Q. 16	 <p>a) U TURN PROHIBITED      b) SPEED LIMIT</p>	2

**Answer any 2 out of the given 3 questions in 30– 50 words each(3 x 2 = 6 marks)**

Q. 17	a. This type of suspension gives the maximum room in the engine compartment due to the absent of upper control arm. b. It is simple in construction and light in weight. c. Due to its light weight, road irregularities are easily countered and hence provide increased road safety. d. It improves the ride comfort and gives a light and self-stabilizing steering, also the wheel camber is more stable. e. In addition to its relatively low initial cost, its maintenance, repair or replacement is less expensive. (Any 3)	3
Q. 18	a. Strength: High torque must be transmitted with the minimum energy due to friction. b. Compactness: Space is limited so the joint must be small and robust. c. Large drive angle: Modern road springs allow large wheel deflections so the joint must be able to accommodate the large drive angle given by this movement. d. Shaft balance: Severe vibration occurs if the shaft runs out-of-true, so the joint must maintain good alignment. (Any 3)	3
Q. 19	Commutator: It is a cylindrical member made of highly conductive copper and made of a large number of segments insulated from each other by means of thin mica sheets. Each segment is connected to the armature conductors. Field windings or field coils: These are made of thick copper wires in the form of coils and used to electro magnetize the poles when current is passed through them. So, the magnetic field of the starter motor is provided by field windings and pole shoes.	3

**Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)**

Q. 20	Construction of Spark Plug Cleaner: A push button is located on the body of the equipment is pushed to supply ignition voltage to the spark plug during gap test. Air valve control, is a wing type handle on the top of the equipment and “Air” is marked on it. This valve control has three positions “OFF”, “AIR” and “SAND”. This control is used to control the flow of air and sand during sand blast cleaning of spark plugs. One needle valve is located to increase or decrease the air pressure during spark test by rotating it anti clockwise and clockwise respectively. Pressure gauge is provided on the equipment to record the pressure applied during the spark plug gap test. Mirror, a metal mirror is	4
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mounted at an angle to the rear of the plug test opening, is used to observe the action of the spark during the gap test. Adaptor and gasket are provided to install different size spark plugs in the test opening. Gap gauge, is provided for the purpose of checking and adjusting spark plug gaps.

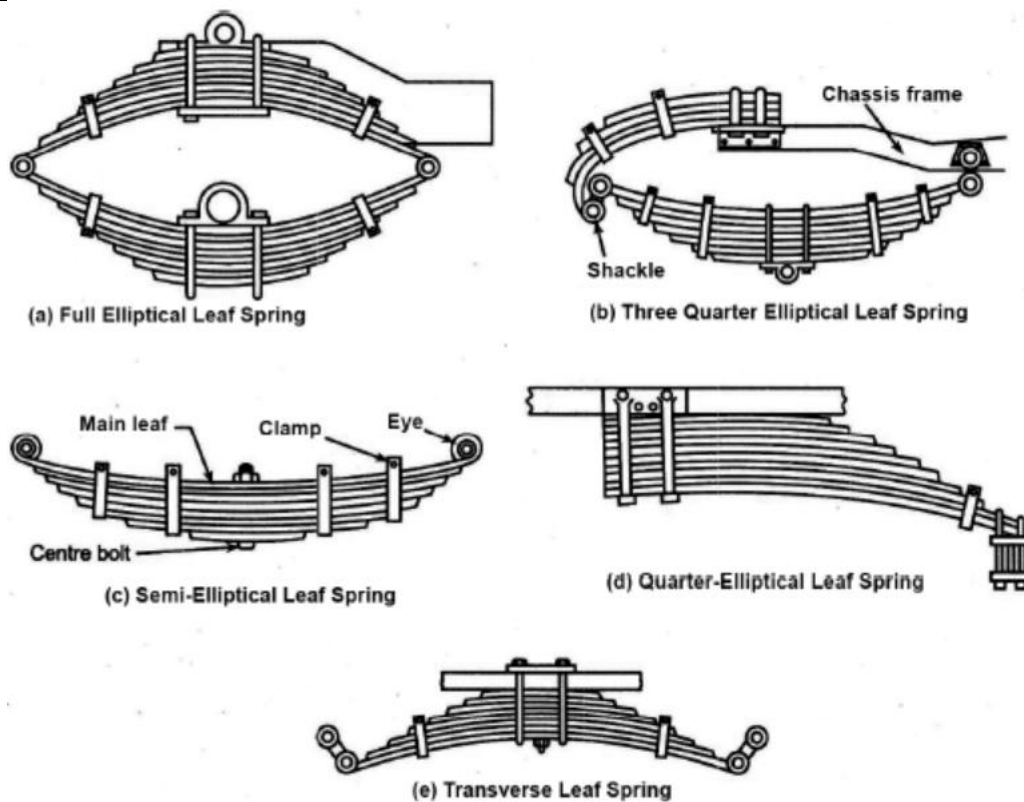
**Working of Spark Plug Cleaner:**

Connect the air line from 125-150 psi air supply to the rear of the air control valve. Ground the equipment properly otherwise the spark gap test won't be up to the mark.

**a. Sandblast Cleaning:** clean the spark plug of any excess oil or water and insert in the opening. With the left hand, turn air control valve to "sand" position. Oscillate outer end of the plug with a circular motion, so that cleaner blast can penetrate all crevices, for about 5 seconds. Without removing plug from the opening, turn valve to "Air" position and again oscillate plug for a few seconds to clean out all particles of loosened carbon. Return the air valve to "off" position and remove the cleaned plug. Shake out any particle of abrasive remaining between plug porcelain and shell.

**b. Gap Testing:** Adjust gap of the old plug and screw old plug in the openings. Clip high tension lead to the plug to be observed. Regulate air pressure to correct amount for plug being tested. Press the test button, gradually opening needle valve until the pressure has been around 20psi above normal. While pressure is being increased, observe action of the spark in the mirror to see if the spark remains bright and steady, without flickering or missing.

Q. 21



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(Any 2)

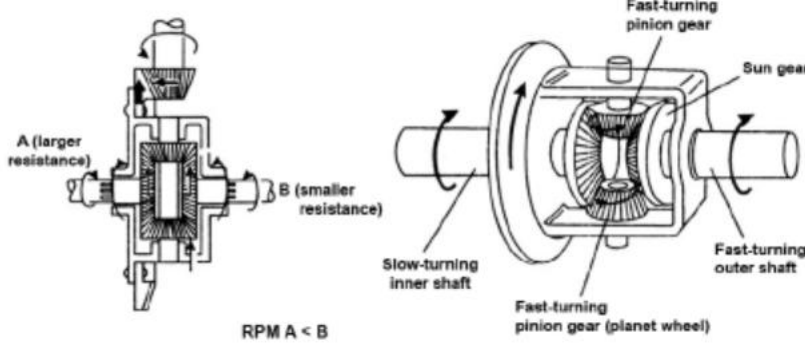
Q. 22

**Turning:**  
When the vehicle is turning, the inside wheel travels less distance (i.e., in a shorter arc) than the outside wheel in comparison with when the vehicle is travelling in a

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straight line. Since a resistance is therefore applied to the left-hand sun gear while taking left turn, as illustrated above in fig. each differential pinion rotates around its own shaft (axis) and also revolves around the rear axle. As a result the rpm of the right-hand sun gear increases.



<p><b>Q. 23</b></p>	<p><b>Working of Starter Motor:</b></p> <p>a. Starter motor armature has many coils fitted on the armature. As principle of starting motor that when a current carrying conductor is placed inside a strong magnetic field, the conductor experiences repulsive force. But starter motor has many conductors on its armature, so the armature is force to rotate between pole shoes with powerful torque to start engine. When the starter switch is 'ON', current from storage battery flows to the starter motor. It sets up a strong magnetic field around the armature coils. The armature coils act as current carrying conductors. The same current from battery also flows through the field windings (or field coils) around pole shoes.</p> <p>b. This makes pole shoes as electromagnets due to which a strong magnetic field is created between pole-shoes. So, the reaction of two magnetic fields (i.e., armature windings &amp; field windings) tends to be distorted or bent the magnetic lines of force of field magnet. Due to distortion of magnetic field the force is exerted on the armature coil, causing the armature to rotate between pole shoes.</p> <p>This torque of starter motor is utilized to crank engine through drive mechanism. Torque exerted by starter motor will be proportional to the amount of current flowing in field coils and armature coils.</p>	<p><b>4</b></p>
<p><b>Q. 24</b></p>	<p><b>Evaporative Emission Control:</b></p> <p>This is a system that captures any fuel vapours coming from the fuel tank and float bowl. It prevents the vapours from escaping into the atmosphere. Harmful hydrocarbon (HC) gas is generated in the fuel tank, and must not be discharged into the atmosphere. In some engines, such fuel vapour is stored temporarily in a container when the engine is off and is sent to the combustion chamber to be burned when the engine we turned on again. The charcoal canister is one such fuel vapour container. It is filled with activated charcoal and charcoal. When the engine is turned on, the gas is sent through the intake manifold to the combustion chamber where it is burned and becomes a harmless exhaust gas.</p>	<p><b>4</b></p>

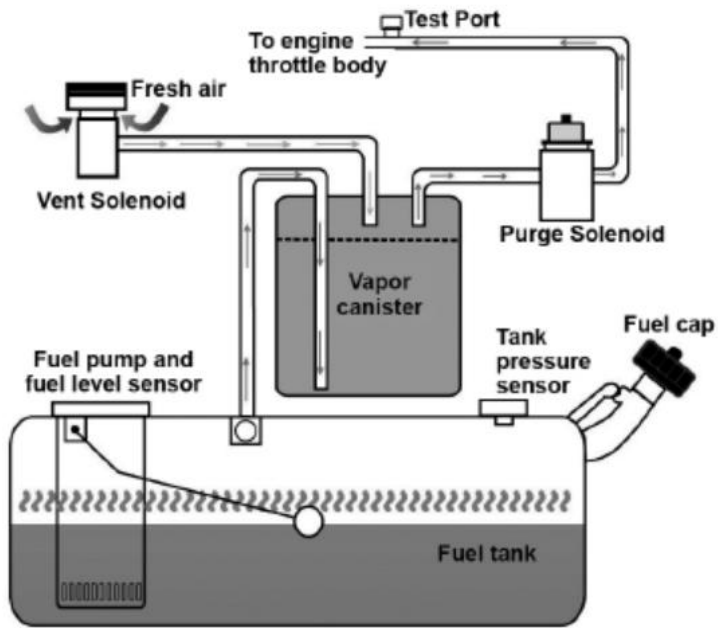


Fig: Evaporative Emission Control