CBSE | DEPARTMENT OF SKILL EDUCATION

AUTOMOTIVE (SUBJECT CODE: 804)

MARKING SCHEME FOR CLASS XII (SESSION 2022-2023)

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

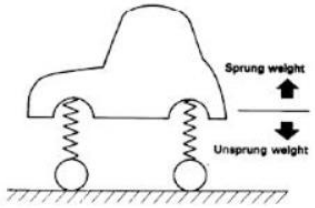
Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**				
i.	borderline	NCERT	2	38	**1**
ii.	c) extraversion	CBSE	2	11	**1**
iii.	d) worksheet	NCERT	3	43	**1**
iv.	b) row	NCERT	3	42	**1**
v.	Self-doubt	NCERT	4	95	**1**
vi.	b) wage employed person	NCERT	4	91	**1**
Q. 2	**Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)**				
i.	a) Tyre inflators	CBSE	1	7	**1**
ii.	Electric motor	CBSE	1	5	**1**
iii.	b) Vane type compressor	CBSE	2	2	**1**
iv.	b) Zero camber	CBSE	2	16	**1**
v.	Caster angle	CBSE	3	17	**1**
vi.	a) Rigid type suspension	CBSE	3	34	**1**
Vii.	a) Universal joint	CBSE	4	56	**1**
Q. 3	**Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)**				
i.	c) Axial flow compressor	CBSE	1	3	**1**
ii.	b) Toe in	CBSE	2	19	**1**

iii.	bending	CBSE	3	39	**1**
iv.	d) yawing	CBSE	3	37	**1**
v.	12 V	CBSE	5	89	**1**
vi.	a) 2 years	CBSE	6	132	**1**
vii.	b) Particulate matter	CBSE	6	143	**1**
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	c) Pressure gauge	CBSE	1	8	**1**
ii.	a)Ackerman's Steering Principle	CBSE	2	14	**1**
iii.	20^{o}	CBSE	4	71	**1**
iv.	d) Spring steel	CBSE	3	49	**1**
v.	Mandatory sign	CBSE	5	140	**1**
vi.	b) Carbon monoxide	**CBSE**	6	151	**1**
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	d) Inertia forces	CBSE	1	11	**1**
ii.	d) steering shaft	CBSE	2	29	**1**
iii.	d) dive	CBSE	3	38	**1**
iv.	Propeller shaft	CBSE	4	53	**1**
v.	coils in series sufficiently	CBSE	5	79	**1**
vi.	b) loss, theft or mutilation	CBSE	6	131	**1**
Q. 6	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	Rotary	CBSE	1	3	**1**
ii.	a) $0\text{-}2^{o}$	CBSE	2	30	**1**
iii.	b) sprung weight	CBSE	3	36	**1**
iv.	b) Universal joint	CBSE	4	54	**1**
v.	c) diodes	CBSE	5	85	**1**
vi.	39	CBSE	6	126	**1**

SECTION B: SUBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)					
Q. 7	Stress is a state of feeling upset, annoyed and hopeless. There are times when we feel nothing is working right. **(1 mark)** Different ways to manage the stress are: **(Any two will get 1 mark)** i. Stay positive ii. Keep your thought in present iii. Talk to friend iv. Practice meditation and yoga	NCERT	2	26	**2**
Q. 8	Four parameters that describe an individual's personality Openness are: **(1/2 marks each)** i. Consciousness ii. Extraversion iii. Agreeableness iv. Neuroticism	NCERT	2	33	**2**

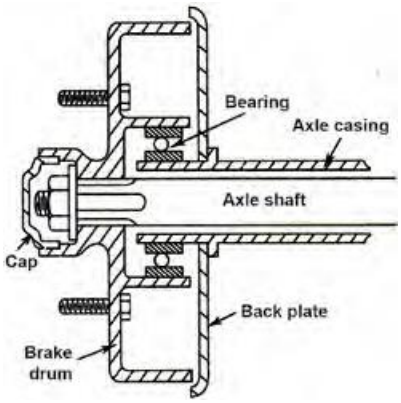
Q. 9	Different steps to start Libre Office Impress are as follows: **(0.4 marks each step)** i. Must ensure that LibreOffice Impress is installed on your computer. ii. Type 'LibreOffice Impress' in the search bar of Windows. iii. Select LibreOffice Impress from the search results. iv. LibreOffice Impress will open. Cancel the 'Select a template' dialog box. v. A blank presentation will open.	NCERT	3	64	**2**
Q. 10	Different characteristics of entrepreneurship are as follows: **(1/2 marks each)** i. It is an economic activity done to create, develop and maintain a profit-oriented organisation. ii. It begins with identifying an opportunity as a potential to sell and make profit in the market. iii. It deals with optimisation in utilisation of resources. iv. It is the ability of an enterprise and an entrepreneur to take risks.	NCERT	4	80	**2**
Q. 11	Start-up- A start-up is a company that is in the first stage of its operations. A start-up and a traditional business venture are different, most notably for the way they think about growth. A start-up is often financed by the founders until the business gets off the ground, and it gets outside finance or investments.	NCERT	4	88	**2**
Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)					
Q. 12	The sprung weight can be defined as the weight which is supported by the suspension springs. The un-sprung weight can be defined as the weight which is not supported by the suspension springs i.e. weight of the components between the springs and road surface.	CBSE	3	36	**2**

					
Q. 13	Car washer supplies the water under high pressure through a flexible pipe and nozzle to clean the body and under carriage of an automobile. A commonly used car washer has following main parts: i. Electric motor ii. Reciprocating water pump iii. Water tank iv. Spray nozzle v. Flexible water pipe vi. Control valve vii. Safety valve viii. V-belt and pulley ix. Pressure gauge	CBSE	1	11	**2**
Q. 14	The main advantage of a hydraulic power steering is that it reduces the force or the manual effort required to operate the steering wheel. **(1 mark)** The hydraulic power steering system has following major components: **(1 mark)** i. Pump ii. Control Valve iii. Power Cylinder iv. Fluid Reservoir	CBSE	2	27	**2**
Q. 15	The main functions of propeller shafts are: **(0.5 mark each)** i. To transmit torque ii. To allow different drive shaft angles iii. To allow changes in length iv. To reduce rotary vibrations	CBSE	4	56	**2**
Q. 16	Emission: It can be defined as any kind of substance released into the air from natural or human sources like flows of gases, liquid droplets or solid particles. **(1 mark)** The main sources of emission are: **(Any two) (0.5 mark each)** i. Point sources ii. Area sources iii. Mobile sources iv. Natural sources	CBSE	6	142	**2**

Answer any 2 out of the given 3 questions in 30– 50 words each (3 x 2 = 6 marks)					
Q. 17	**Documents required for learner license: (1.5 mark)** 1) Form No. 1, 2, 3 2)Three copies of recent passport size photograph of applicant 3) Proof of residence 4) Proof of Age 5) Proof of citizenship 6) In the case of an application for transport vehicle, the driving license held by the applicant. 7) Appropriate Fee has specified in rule 32. **Documents required for permanent license (1.5 mark)** An application for a driving license shall be made in form no.4 and shall be accompanied by : 1) An effective learner's license to drive the vehicle of the type to which application relates 2) Appropriate fee as specified for the test of competence to drive and issue of license. 3) Nationality Proof. 4) Proof of citizenship. (Attested photocopies) 5) One recent passport size photograph 6) A driving certificate in Form No. 5 & 14 issued by the school or establishment from where the applicant received instruction. 7) The vehicles for test which category you are applying the license.Your original license in case of endorsements of categories.	CBSE	6	122-123	**3**
Q. 18	A modern universal joint is expected to meet the following requirements: **(1.5 mark)** i. Strength ii. Compactness iii. Large drive angle iv. Shaft balance v. Operating speed **Any one explanation (1.5 mark)** i. **Strength:** High torque must be transmitted with the minimum energy due to friction. ii. **Compactness:** Space is limited so the joint must be small and robust. iii. **Large drive angle:** Modern	CBSE	4	56	**3**

	Road springs allow large wheel deflections so the joint must be able to accommodate the large drive angle given by this movement. iv. **Shaft balance:** Severe vibration occurs if the shaft runs out-of-true, so the joint must maintain good alignment. v. **Operating speed:** The joint must operate efficiently at higher speed under the conditions of high torque and variable drive angle. This requirement must be combined with the need for the joint to have a long life and minimum maintenance.				
Q. 19	Working principle of Self-starter: It is based on the principle of Fleming's Left Hand Rule, which states that when the thumb, fore finger and middle finger of the left hand are position at right angle to each other as shown in the figure then, fore finger indicates the direction of the magnetic field, the middle finger represents the direction of the current in the conductor and the thumb indicates the direction of the force on the conductor. **(2 marks)** When a current carrying conductor is placed in a magnetic field, a mechanical force is experienced by the conductor. The magnitude of this force (F) is directly proportional to the magnetic field strength (B) and the current (I) flowing in the conductor. **(1 mark)**	CBSE	5	89-90	**3**
Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)					
Q. 20	**Electronic Power Steering System**: 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,	CBSE	2	29	**4**

	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. **(4 marks)**				
Q. 21	Applications of Air Compressor in automobile industry: **(Any Four 1 marks each)** i. Portable air compressor for powering pneumatic tools, such as jack-hammers, wrenches etc. ii. To supply high-pressure clean air to fill gas cylinders iii. For filling tyres iv. For operating different equipment such as spark plug cleaner and tester v. Body Painting	CBSE	1	4	**4**
Q. 22	**Compression Cycle (Bound):** As the shock absorber is compressed by rising wheel the piston rod assembly moves down in relation to the cylinder thus creating a pressure below the piston. The oil flows through the outer ring of holes lifting the flap valve against its spring the volume of the piston rod entering the cylinder displaces an equal volume of oil which is forced through the holes in the valve, past the spring discs and into the reservoir. **(2 marks)** **Extension Cycle (Rebound):** On the rebound the shock absorber is extended reversing the flow of oil. The lower flap valve moves against the helical spring uncovering the inner ring of holes and allowing oil to flow through. As the piston rod is withdrawn from the cylinder an equal volume of oil is recuperated from the reservoir through the central orifice in the valve assembly. **(2 marks)**	CBSE	3	45	**4**

Q. 23	Three quarter floating type rear live axle: In this type of rear axle, a single bearing is installed between the axle housing and the wheel hub and the wheel is fitted directly to the shaft. Most of the vehicle weight is supported by the housing, although lateral loads during turning are applied to the axle shaft. The axle takes care of driving and cornering torque. This type of rear axle is used in small and medium vehicles. **(2 marks)**  **(2 marks)**	CBSE	4	66-67	**4**
Q. 24	The auto electrical system has various electrical equipment and wires and serves the following purposes: i. To generate the electricity for charging of battery. ii. To supply current to starting motor for cranking the engine. iii. To charge the battery and supply the current to various units of an automobile. iv. To supply current to the lighting system for operation of head lights, brake lights, flashers, fog lights, dippers, direction indicators etc. v. To supply current to the ignition coil for fuel ignition in petrol engine. vi. To supply current to horn, wipers, meters, gauges and dash board instruments. vii. To supply current to various other electrical accessories.	CBSE	5	75	**4**