

## STEP WISE MARKING SCHEME

**CLASS 12<sup>TH</sup>**

**AUTOMOTIVE**

Q.NO	ANSWERS	MARKS
<b>1</b>	<p>. Ignition warning lamp fails to illuminate when ignition is switched 'on'</p> <ul style="list-style-type: none"> <li>• Defective bulb</li> <li>• Fuse blown</li> </ul> <p>. • Alternator or battery connections loose or oxidized poor earth connection. Open circuit in regulator, rotor or brush circuits.</p> <ul style="list-style-type: none"> <li>• Ignition switch defective.</li> <li>• Fit new bulb.</li> <li>• Fit new fuse.</li> <li>• Clean and tighten battery or alternator cables, applying acid resistant grease. Check earth connections, clean and tighten as necessary.</li> <li>• Eliminate open circuit. Fit new ignition.</li> </ul> <p>2. Ignition warning lamp remains 'ON' when engine is running.</p> <ul style="list-style-type: none"> <li>• Drive belt slack. Fuse blown.</li> <li>• Alternator connections loose or oxidized, poor earth connection.</li> <li>• Brushes do not contact slip rings, are jammed in their guides, are worn, broken, oily or dirty. Worn bearings, slip rings, defective regulator or rectifier assembly.</li> <li>• Adjust drive belt. Refer to Service Manual. Fit new fuse</li> <li>• Clean &amp; tighten connections as necessary. Fit new alternator</li> </ul> <p style="text-align: center;">OR</p> <p>Brown Cables Brown cables are used for the battery circuit. It is used from the cranking motor switch to the ammeter, to the radio receiver, to the electric clock, to the inspection sockets and to the battery auxiliary fuse. Yellow Cables These are used for the generator circuit. The cable is used from the generator terminal to the corresponding control-box terminal and to the ignition warning light.</p> <p>White Cables These cables are used for the ignition circuits and also for other circuits which do not require fuses and are operated through the ignition switch, such as the electric fuel pump, motor starter, solenoid switch and so on.</p> <p>Green Cables These cables are used for all the auxiliary circuits which are fed through the ignition switch but are protected by the fuses. Examples of these circuits are the brake stop lamps, the fuel gauge, the windscreen wipers, the direction indicators, etc.</p> <p>Blue Cables These cables are used for the headlamp circuits. These cables are used for the side and tail lamp circuits. It is also used for fog lamps, panel lights and other lamps which are only used when the side lamps are in operation.</p>	<b>5</b>
<b>2</b>	<p>In I.C. engine during power stroke, the engine temperature reaches between 700 – 900 oC. The 30% heat is released during exhaust</p>	<b>5</b>

	<p>stroke. The cooling system removes approximately 30% of heat. (In a vehicle, most of the energy of fuel (approx. 70%) is converted into heat, and it is the job of the cooling system to take care of that heat. The primary job of the cooling system is to keep the engine from overheating by transferring this heat to the air. ) Cooling is necessary because high temperature damages engine components and changes the viscosity of lubricants. The cooling system protects the engine components by circulating coolant through the passages provided in cylinder block, cylinder head. The heat is collected by the coolant and the coolant will be sent to radiator. The radiator radiates the heat and cools down the coolant temperature. The air circulated around the engine also disperses the heat and allows the engine to maintain optimum temperature</p> <p style="text-align: center;">OR</p> <p>Servicing of the drive shaft</p> <ol style="list-style-type: none"> <li>1. Remove the engine cover.</li> <li>2. Use appropriate spanner and remove the drive shaft nut and washer.</li> <li>3. Drain the transmission oil from engine/gear box. Drive Shaft</li> <li>4. Using large screw drivers, pullout the driving shaft joint, so as to release snapping fitting of joint so as to release snap ring fitting of joints spline at differential side.</li> </ol>	
3	<p>Multi Point Fuel Injection system (MPFI): Due to legislative requirement to reduce exhaust gas emissions (air pollution) and to increase demands in term of performance of engine, driving comfort and control and safety, MPFI system has been introduced. This system is also called Motronic engine management system. In this system each cylinder has number of injectors to supply/spray fuel in the cylinders as compared to one injector located centrally to supply/spray fuel in case of single point injection system. Advantage of M. P. F. I.</p> <ol style="list-style-type: none"> <li>1. More uniform Air-Fuel ratio will be supplied to each cylinder, hence the difference in power developed in each cylinder is minimum. Vibration from the engine equipped with this system is less, due to this the life of engine components is improved.</li> <li>2. No need to crank the engine twice or thrice in case of cold starting as happens in the carburetor system.</li> <li>3. Immediate response, in case of sudden acceleration / deceleration.</li> <li>4. Since the engine is controlled by ECM* (Engine Control Module), more accurate amount of A/F mixture will be supplied and as a result complete combustion will take place. This leads to effective utilization of fuel supplied and hence low emission level. ECM is also known as computer of the vehicle.</li> <li>5. The mileage of the vehicle will be improved.</li> </ol> <p style="text-align: center;">OR</p> <p>A wheel is a circular component that is intended to rotate on an axle bearing. The wheel is one of the key components of the wheel and axle which is one of the six simple machines. Wheels,</p>	5

	<p>in conjunction with axles, allow heavy objects to be moved easily facilitating movement or transportation while supporting a load, or performing labor in machines. Wheels are also used for other purposes, such as a ship's wheel, steering wheel, potter's wheel, and flywheel.</p> <p>Common examples can be found in transport applications. A wheel reduces friction by facilitating motion by rolling together with the use of axles. In order for wheels to rotate, a moment needs to be applied to the wheel about its axis, either by way of gravity or by the application of another external force or torque. Using the wheel, Sumerians invented a device that spins clay as a potter shapes it into the desired object</p>	
4	<p>The electrical system of present-day cars is quite complex. Connecting each electrical component individually is a tedious and costly affair. With the adoption of wiring harness method, it has become quite simple to connect the various electrical components. It has also resulted in space saving and safeguarding of the individual cables from metal objects.</p>	3
5	<p>Working of Differential: Input torque is applied to the ring gear, which turns the entire carrier, providing torque to both side gears, which in turn may drive the left and right wheels. If the resistance at both wheels is equal, the planet gear does not rotate, and both wheels turn at the same rate</p> <p style="text-align: center;">OR</p> <p>A test light is used when the technician needs to “look” for electrical power in the circuit. The test light handle is transparent and contains a light bulb. A sharp probe extends from one end of the handle while a ground wire with a clamp extends from the other end. If the circuit is operating properly, clamping the lead of the test light to ground and probing the insulated side of the circuit, the lamp should light.</p>	3
6	<p>It includes activities for which there is no apparent reward but one derives enjoyment and satisfaction in doing them. It occurs when people are internally motivated to do something because it brings them pleasure. They think it is important or feel what they are learning is significant. Incentives related to the motive or goal can satisfy one’s needs</p> <p style="text-align: center;">OR</p> <p>Shackle: A spring shackle is a device found on leaf-spring equipped vehicles. The spring shackle mounts to one end of the leaf spring and allows it to flex and move while keeping the tire on the road. Without a shackle, the spring would not be able to move and the tire would be pulled off of the road's surface when a bump or obstacle was encountered. The spring shackle can also be lengthened and give lift or a greater amount of ground clearance to the vehicle.</p>	3
7	<p><b>Worm and worm Rack and pinion</b></p>	3

	<b>Ackerman</b>	
<b>8</b>	Automobile is a complex unit of machinery. This requires regular services to maintain in originality in performance, appearance, control, and safety efficiency. The Research and Development in auto manufacturers facilitates all the comforts with efficiency so it is the duty of service workshop to maintain originality in performance of vehicle. The manufacturers develops service manual which gives clear cut ideas of their product, like material used specification, service limit, span life of component,	3
<b>9</b>	A piston ring is a split ring which fits into a groove of an internal combustion engine or steam engine. The main functions of piston rings in internal combustion engine are: 1. To seal the combustion chamber so that there is no transfer of combustion gases from the chamber to the crankcase. 2. Supporting heat transfer from the piston to the cylinder wall. 3. Regulates engine oil consumption and avoids oil leakage. 4. To withstand compression pressure during compression and power stroke	3
<b>10</b>	the <b>stress management</b> is all about how to deal with <b>stress</b> , anxiety, how to keep our mind calm. <b>Stress</b> makes us restless, uncertain, insecure and it's destructive for us OR Engine control module is control engine electronics system	2
<b>11</b>	Index <ul style="list-style-type: none"> <li>• Page number</li> <li>• Expanded view of assembly</li> <li>• Disassembly sequence</li> <li>• Tolerances, gazes, sizes of components</li> </ul>	2
<b>12</b>	Clutch engagement judder is a phenomenon wherein the driver experiences vibrations on seat during the clutch engagement process for the vehicle launch	<b>2</b>
<b>13</b>	Main components of an automatic transmission are converter housing case, oil pan and extension Housing. There are two types of Automatic transmission namely automated manual transmission (AMT) and continuously variable transmission (CVT).	2
<b>14</b>	he cables connecting the ignition coil to the central point of the distributor and from the distributor to the various spark plugs fall under the category of HT cables. These cables are subjected to very high voltages such as those of the order of 6000-22,000 V. OR Fuses are used for protecting the electrical equipment and circuits against the effects of excessive currents.	2
<b>15</b>	Valve mechanism: It controls submission of inlet gases and emission of exhaust gases at right time in relation with rotation of cam shaft. Valve mechanism are classified as given below 1. Overhead valve mechanism (OHV) 2. Overhead Cam mechanism (OHC)	2
<b>16</b>	C-TOE IN	<b>1</b>
<b>17</b>	D-5	<b>1</b>
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<b>22</b>	FOUR	<b>1</b>
<b>23</b>	ALL	<b>1</b>
<b>24</b>	OVER HEAD CAM MECHANISM	<b>1</b>
<b>25</b>	FALSE	<b>1</b>
<b>26</b>	FALSE	<b>1</b>
<b>27</b>	ALL	<b>1</b>
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