Question 1. The drawing of a car emblem is shown below. By means of geometrical construction, line AB has been enlarged to A/B₁. Complete the construction to enlarge the whole drawing using centre O as the pole.

Note: To save time, construct the left-hand side of the emblem and mirror copy (reflect) the right-hand side.
10 marks

Question 2. The profile of a sports car is given on the right. Using the given start lines and dimensions, draw the view showing clearly the construction required to complete the part ellipse, and to locate the required centres.

Notes:
- Start by constructing the part ellipse AB having a major axis of 110 mm and a minor axis of 40 mm.
- Points A, B, C, D, and G are all points of tangency.
- Points B and E are endpoints of arc R70.
- F and F₁ are centres of the two R5 arcs.

16 marks
Question 3. A pictorial view, an end view, a plan view and an incomplete front view of a LINKAGE BRACKET are given.
   a. Complete the sectional front A-A.
   b. Print the angle of the projection used.
   10 marks

Question 4. Three full size orthographic views of a car engine BEARING CAP are given below. Measure the given drawings and:
   a. insert three important linear dimensions,
   b. insert two important radial dimensions,
   c. using the given start lines below, project a planometric view of the Bearing Cap.

Note: Place corner X in the lowermost position.

16 marks
Question 5. The figure below shows an incomplete version of motor vehicle instrument panel. Graphic symbols (two of which are shown enlarged below), indicate the function of the respective instruments / gauges, indicators and warning lights. The blank indicator lamp situated in the lower centre of the dashboard is intended to remind the driver to wear the seat belt. You have been asked to design the required graphic symbol which should have the same characteristics as the symbols given below. In the spaces provided below, draw:
   a. one preliminary sketch that illustrates your developing idea,
   b. a final developed drawing based on your initial sketch.

12 marks

Question 6. The figure below shows a car side door mirror. Using the space provided below, determine graphically the visible area of the mirror.

12 marks

![Mirror Diagram]

**Final Drawing**

of the wear seat belt symbol

- Oil pressure symbol
- Battery level symbol
- Wear seat belt symbol

**Preliminary sketch**

**AREA OF MIRROR**

<table>
<thead>
<tr>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL AREA OF MIRROR** $cm^2$

<table>
<thead>
<tr>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Question 7. The drawing shows a car windscreen wiper mechanism which consists of the following items:

- fixed pivots O and S
- crank OB
- link AB
- wiper AD

Crank OB rotates about fixed pivot O.
Link AB is pivoted at A and B.
Wiper AD oscillates about fixed pivot S.
Pivot A oscillates about pivot S along the path of arc QR.
The locus of point P for the first quarter turn of the crank is given.

Plot the locus traced out by the mid-point P of link AB for the remaining three quarters of a revolution of crank OB.

12 marks

Question 8. The figure on the right shows a plan view of the starting line of a car racing track. The incomplete drawing below shows a single-point perspective version of the track.

a. Complete the drawing and show clearly the construction necessary to determine the size of the receding squares and letters.

b. Neatly shade your drawing.

12 marks