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## Examiners' Report - Paper A (Electricity/Mechanics)

### General considerations

Candidates are expected to draft an independent claim which offers the client the broadest possible protection. The client is a supplier of automotive components. The invention relates to motorcycle lighting and allows to compensate for the inclination of the motorcycle on which the headlamp is to be installed.

The main aspect in the client's letter was the headlight itself, with different embodiments corresponding to different types of headlights. A further aspect was the control assembly which comprises sensors and a control unit for calculating the inclination of the motorcycle relative to the road surface and controlling the headlight so as to provide an adequate illumination of the road.

Although the headlight is to be mounted on a motorcycle, the headlight can be sold alone and it should have been apparent that protection for the headlight itself should be obtained. Good candidates directed their answer to a headlight or a lighting system followed by a claim relating to a vehicle comprising such a headlight/lighting system, thus obtaining complete protection of the invention.

The challenge of the paper consisted then in analysing the technical aspects of the headlights, of discovering the available protection in view of the prior art and obtaining a broad independent claim covering the different embodiments.

The main difficulty was to draft a claim which fulfils the requirements of novelty and inventive step in view of the three documents of the prior art.

D1 discloses a vehicle wherein the headlight can be rotated around a vertical axis during the turn. The assembly comprises sensors, a microprocessor, an electric motor and a gear.

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D2 discloses a motorcycle lighting assembly comprising three separate headlights with different orientations. According to the inclination of the motorcycle, one of the headlights is switched on so as to obtain a light beam pattern which compensates for the inclination. A microprocessor receives inputs from distance sensors and controls the switching of the headlights accordingly.

D3 discloses a headlight which comprises a reflector and a light source with an integrated screen. The reflector and the screen can rotate around the axis of symmetry Y-Y of the reflector, which is the optical axis (see definition provided in client's letter page 3, first paragraph and page 4, first paragraph). The arrangement comprising the reflector and the gear wheels can be integrated within a specially constructed headlight housing

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## Independent claim (50 points)

### Expected solution

The independent claim should cover the different embodiments:

- the first embodiment (Fig. 5-6) has a parabolic reflector and a rotating lamp with integrated dimmer screen,
- the second embodiment (Fig. 7-8) has an ellipsoid reflector with a fixed lamp and a dimmer screen mounted separately from the lamp,
- the third embodiment (not shown) has an ellipsoid reflector and a rotating lamp with integrated dimmer screen.

The preferred independent claim comprises a combination of the following features, it being understood that the features might have been expressed using different wording:

- (a) - a headlight/lighting system for a two-wheeled vehicle comprising
- (b) - a light source
- (c) - a reflector
- (d) - a dimmer screen
- (e) - being configured to provide a light beam pattern
- (f) - which is rotatable so as to compensate for the effect of inclination of the vehicle
- (g) - the dimmer screen is rotatably mounted relative to the reflector.

Claims excluding one or more embodiments have been heavily penalised.

Candidates who drafted several independent claims of the same category or used alternatives within a single claim in order to cover the different embodiments lost points.

Only a rotation of the dimmer screen is mentioned in the client's letter. However, it may be possible to imagine more generic solutions such as a screen that can "move" relative to the reflector, e.g. a screen with moving blades. These solutions were considered to be equivalent to the preferred solution.

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An additional method or use claim was not expected. A separate application relating to the control assembly was also not expected.

### **Inferior solution**

Claims drafted towards a “lighting system comprising a light source, a reflector, a dimmer screen, inclination sensors, an electronic control unit and an electric motor” were considered as inferior because they are not directed to the main aspect of the client’s letter and could not attract maximum points.

### **Novelty**

Lack of novelty is a serious deficiency and can cause the loss of more than half of the marks available for the independent claim.

The features:

- “a screen rotatable relative to the optical axis/axis of symmetry”
- “drive/rotating means are within a housing”

were not able to establish novelty over D3.

### **Inventive step**

D3 did not explicitly disclose the relationship between the housing and the mechanism. However, the most straightforward implementation is to have the housing fixed in relation to the motorcycle, whereby the reflector and the components inside the reflector are rotatable with respect to the housing. In view of this, more than half of the marks available for the independent claim could be lost.

In other cases, lack of inventive step caused the loss of up to half of the available points. For example, D1 provides the indication that many problems, in particular the problem of the limited space, can be overcome by replacing mechanical systems by systems comprising electric motors and sensors. Therefore, the mere replacement of the weight assembly for turning the headlight of D3 by an “electric motor” or by “electric drive means” was considered to be obvious.

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## **Clarity**

Lack of clarity is penalised according to its seriousness. The following examples are given in order of seriousness.

Only claiming the underlying problem, e.g. “means to compensate for the inclination of the light beam pattern”, has been heavily penalised.

The features “standard housing” or “conventional size” were considered rather unclear.

Feature (f) was considered as being an essential feature for solving the problem related to the inclination. A mere general rotation of the dimmer screen and thus of the light distribution pattern (for example the rotation around a horizontal axis to change between low beam and high beam) does not specifically solve the problem of the inclination.

Candidates lost points when drafting a claim directed to a headlight but which was further defined by external features like sensors fixed to both sides of the motorcycle.

A claim covering a headlight only in use lost some points.

## **Unnecessary limitations**

Marks were lost for unduly restricting the independent claim.

The use of each of the following features was considered as an unnecessary limitation for the preferred solution:

- electric motor
- gear, gear wheel
- inclination sensors
- electronic control unit
- speed sensor
- housing / lens
- rotation around the optical axis

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## **Formal matters**

Each formal deficiency, such as a lack of two-part form (the use of which was clearly appropriate in the present case), a clearly incorrect two-part form or the lack of reference signs resulted in a deduction of points.

## **Dependent claims**

Maximum points were awarded if the dependent claims

- provided a good fall-back position;
- covered all three embodiments indicated in the description;
- were correct with regard to their back references; and
- were clear.

According to the Instructions to Candidates, the dependent claims should be limited to a reasonable number. However, the juxtaposition of distinct non-interfering features in a dependent claim does not appear to be appropriate because such a claim may not provide a good fall-back position.

The order, the structure and the dependency of the dependent claims should be correct. In particular, multiple dependency should be used whenever appropriate. Later restriction to a particular combination of features could otherwise be more difficult.

The following features were expected to be covered by dependent claims:

- rotation around the optical axis (X-X)
- screen integrated within light source / rotation of the bulb-screen
- fitting with gear wheel (20) which meshes with a gear (19)
- screen separate from light source / screen rotates relative to the light source
- screen (117) between the second focal point and the light source

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- screen (117) guided by pins (26) running in arcuate groove
  - screen (117) with a toothed portion (120)
  - shape of the screen with an angle between the two edges
  
  - electric motor for driving the screen
  - the motor being within the headlight housing
  
  - lighting system comprising a headlight according to one of the preceding claims
  - means for determining the angle of inclination
  - comprising at least a distance sensor
  - ECU for receiving data from the distance sensors and for calculating the side and angle of inclination such that the amount of rotation of the light beam pattern is based on the angle of inclination
  - activation of the mechanism only when speed above predetermined speed
  
  - 2-wheel vehicle / motorcycle having lighting system.

## Description

The closest prior art should be identified consistently with the preamble of the independent claim.

D3 was considered as closest prior art for the preferred solution. In particular, in document D1, the whole headlight is turning and the problem of inclination is not mentioned. In D2, there is no movement of elements within the headlight. An analysis of the headlight described in D3 was expected in order to get full marks. This can not be achieved by merely copying passages from the description of the prior art without any adaptation. Many candidates lost time by providing a detailed description of each of the documents of the available prior art.

Moreover, in order to get full marks, it should be clear from the description which document is considered as being the closest prior art.

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The candidates were expected to disclose the invention in such terms that the technical problem and its solution could be understood. An explanation of the disadvantages of the closest prior art and/or of the effects achieved by the differing features of the invention was expected.

Points were lost when the statement of the problem or of the solution was not consistent with the independent claim.

General statements like the problem to be solved is to improve the known apparatus or to avoid the disadvantages of the state of the art did not attract any points.

It is pointed out that the submission of pre-prepared materials as part of the answer paper is contrary to the Regulations (see "Instructions to candidates concerning the conduct of the examination", paragraphs 4. and 5.7). Such materials are disregarded for marking.



**EXAMINATION COMMITTEE I**

Candidate No. ....

Paper A (Electricity/Mechanics) 2005 - Schedule of marks

Category	Maximum possible	Marks awarded	
		Marker	Marker
Independent claims	50		
Dependent claims	35		
Description	15		
Total	100		

Sub-Committee for Electricity/Mechanics agrees on .....marks and recommends the following grade to the Examination Board:

PASS  
(50-100)

FAIL  
(0-49)  
COMPENSABLE FAIL  
(45-49, in case the candidate sits  
the examination for the first time)

29 July 2005

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Chairman of Examination Committee I