



L-Università
ta' Malta

MATSEC
Examinations Board



Examiners' Report

IM Engineering Drawing and Graphical Communication

First Session 2022

Examiners' Report (2022): IM Engineering Drawing and Graphical Communication

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A. STATISTICAL INFORMATION

The total number of candidates who registered to sit for Engineering Drawing and Graphical Communication was 88.

Table 1 shows the distribution of grades for the First 2022 session of the examination.

GRADE	A	B	C	D	E	F	ABS	TOTAL
NUMBER	3	6	23	13	13	19	11	88
% OF TOTAL	3.4	6.8	26.1	14.8	14.8	21.6	12.5	100

Table 1: Distribution of grades for IM Engineering Drawing & Graphical Communication 2022, First Session.

B. GENERAL REMARKS

In general, quality of the line work was satisfactory. The overall quality of drawing presented was adequate, with candidates making use of good quality pencils and presenting neat solutions. The quality of lettering on the drawing of many candidates was poor. A number of candidates performed inadequately since the rubric instructions were not followed. Responses of the assembly drawing indicate a good understanding of the principles involved.

C. COMMENTS ON SECTION A

Question 1: Parallel system of forces acting on a beam (13 marks)

The majority of the candidates presented the space diagram and the load line to the given scales adequately. The application of Bow's notation was generally adequate. However, the labelling was very poor. Responses indicate that most candidates were aware of how to obtain the polar diagram and apply the link lines to obtain the bending moment diagram. Responses indicate that some candidates were unaware that the lines of action did not fall with the supports. The 'closer' on the funicular polygon was often drawn across the whole space and transferred by a parallel line to the polar diagram. This error resulted in an incorrect graphical reading and the values of the left and right reactions were therefore incorrectly determined. In many cases, the magnitude of the reactions were not stated. Candidates' attempt to draw the shear force diagram was average as the attempt to translate from the shear force diagram to the beam loading was insufficient. Some candidates did not include this diagram.

1 to 6	7 to 12	Full marks	Not attempted
17	34	6	20

Candidates' performance in question 1

Question 2: Auxiliary plan (13 marks)

Some of the candidates did not include the width of the sectioned pyramid and the prism on the plan. The auxiliary plan of the sectioned stand perpendicular to the section A-A, was either not shown or projected

incorrectly. The attempt in some responses was insufficient, since the width of the sectioned pyramid and prism were incorrect.

1 to 6	7 to 12	Full marks	Not attempted
22	11	0	44

Question 3: Development of a cylindrical bar (13 marks)

Some of the construction lines were barely visible, while other construction lines were shown as bold as the outline of the solution. Most of the candidates presented the side elevation adequately. Only a few candidates left out minor details. The surface development of the uncut cylinder was completed by most of the candidates. However, only a few candidates included the sections on the pattern correctly.

1 to 6	7 to 12	Full marks	Not attempted
32	18	0	27

Question 4: Development of an Oblique cone (13 marks)

A pictorial illustration of an oblique cone showed the final result, after parts of the oblique were removed. The front view of the oblique cone showed how the top portion was sectioned off by a curved section plane and also removing a small segment of the base.

1 to 6	7 to 12	Full marks	Not attempted
17	6	2	52

Question 5: Triangular prism intersecting a square prism (13 marks)

Most of the candidates only managed to copy the complete plan, the auxiliary plan and the incomplete projection of the front elevation. Some presented the lines of intersection on the elevation without showing how the intersecting points of the two prisms were found, joining the lines by bold and hidden details, by guess work. The X-Y and the X1-Y1 were very often not presented. Full marks were only awarded when neat clear correct solution was presented, showing light construction lines for every intersecting point between the two prisms, also including letters/numbers, making it very simple and easy to follow how the points were obtained.

1 to 6	7 to 12	Full marks	Not attempted
21	4	1	51

Question 6: Compression Spring (13 marks)

This question was attempted by most candidates with the majority being able to obtain good marks. Most responses indicate that candidates were familiar with the basic construction of the helix and correctly presented the helix on the first pitch. In some cases, the lower part of the complete solution was constructed correctly, however, the upper half was shown distorted. In other instances, the quality of the final presentation of the visible helices was poor. In some responses, the construction lines and the bold lines of

the helices were of the same thickness. There were some responses in which final drawing was left with no title and annotations.

1 to 6	7 to 12	Full marks	Not attempted
34	22	7	14

D. COMMENTS ON SECTION B

Question 7: Balanced Lever (24 marks)

Candidates had to present a sectional elevation of the assembled balanced lever and a half outside end elevation. A proposed layout of the final drawings was essential before starting the on the solution. Responses indicate that the exploded view of the balanced lever illustration and the short notes encouraged most of the candidates to attempt this question. The general outline of all the parts were assembled in the correct position. However, some responses indicate a very basic knowledge of drawing engineering practice was lacking. Threaded portion of the stud were shown assembled on a blank hole of the lever. Cross-hatching areas were drawn on hidden details on some solutions. It was evident that a few candidates used the 30° or 60° setsquare and not 45° setsquare for hatching. The radius of the front chamfers of the hexagonal nut were not drawn neatly. Responses indicate that a significant number of candidates did not know the sectioning principles of the webs. In some responses, webs were hatched. Some candidates did not present the outside view of the end elevation. Very often, letters on the arrows and the title 'Section A-A' below the sectional view were missing.

1 to 11	12 to 23	Full marks	Not attempted
9	13	0	55

Question 8: Valve Assembly (24 marks)

Responses indicate that some candidates did not plan the space for the two views requested, presenting a cramped drawing. Other candidates performed poorly by merely reproducing a copy of the given outside view of the valve in the middle of the drawing sheet. The general outline of the sectional view of the valve was satisfactory and the parts were correctly assembled. Very often, the vertical and horizontal centre lines were unclear, or not drawn according to the specification. Moreover, hatching lines were very often not drawn as recommended on the sectional view and on some solutions were too dark. Some candidates forgot to write down the title 'Section X-X' and the letters on the arrows below the sectional view. The cutting plane was rarely drawn. Responses indicate that certain candidates were unaware that it is not expected to section nuts, bolts, washers, keys, pins, shafts, or other similar solid components. Some solutions indicate that candidates were unfamiliar with the rule regarding when to section a web. The threaded holes were often omitted. Other candidates did not show that the holes were threaded.

1 to 11	12 to 23	Full marks	Not attempted
5	9	0	63

Question 9: Isometric view (24 marks)

The majority of the candidates did not attempt this question. Most of the candidates who attempted this question performed adequately. The solution was well placed on the page because they constructed the isometric crate centrally, leaving enough space for the construction of the ellipses. Other candidates did not construct the isometric crate, leading to a finishing with a portion of the solution outside the border of the drawing sheet. Very often, the method of constructing the ellipse and presentation of the isometric view of the ellipses was neat and clear. Several candidates' performance in presenting the central portion of the ratchet was inadequate. A few candidates presented the whole isometric crate of the ratchet, without representing one single ellipse on the solution.

1 to 11	12 to 23	Full marks	Not attempted
8	12	0	57

E. COMMENTS ON SECTION C

Question 10: Two-point Perspective of a Small Library (24 marks)

The candidates were asked to project an estimated two-point perspective and render in colour their perspective line drawing to enhance its presentation. Responses indicate that most of the candidates were well-prepared for this question. The following are some of the shortcomings:

- i). The foreshortening of the length and width of the initial crate was incorrect, with some candidates taking measurements on perspective lines using the division of a line method.
- ii). Some candidates did not construct the wooden horizontal shelves correctly. Other candidates' attempt in constructing the top part of the wooden book display and drawing the construction lines to the vanishing points was very poor.
- iii). The rendering, in some drawings, was either not done or done very untidily. Hence, ruining the underlying line drawing.

1 to 11	12 to 23	Full marks	Not attempted
4	26	4	43

Question 11: One-point Perspective of a Room (24 marks)

The candidates were asked to project an estimated one-point perspective of this room, the viewing direction required was indicated by the arrow in the plan. The candidates were also asked to render in colour their perspective to enhance its presentation. Responses indicate that the majority of the candidates who attempted this question were familiar with the topic and presented a satisfactory solution. They completed the initial constructions to determine the picture frame and the perspective grid. Most candidates appropriately completed the one-point perspective. Other candidates, however, performed inadequately due to the following shortcomings:

- i). Some candidates did not construct the correct foreshortening.
- ii). A number of candidates used a different viewing direction from the one given.

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- iii). A number of candidates' attempt in constructing the two elongated hexagonal windows and the width of the aluminium door was inadequate.
- iv). Some candidates' perspective was not rendered. A few candidates rendered untidily the solution, hence ruining the underlying line drawing.

1 to 11	12 to 23	Full marks	Not attempted
4	18	1	54

Question 12: Poster Design (24 marks)

The quality of freehand sketching presented on most of the responses used colour or shading with good effect, thus enhancing the sketch, and giving a three dimensional appearance. Other responses, though were inadequate, due to the following main hitches which are worth noting:

- i). A number of candidates did not use an appropriate typography for the poster heading.
- ii). Some graphic app icons did not display the theme, nor match the theme suggested. Besides, these were difficult to understand and did not follow the requisites suggested by the Merrill Buses investors.
- iii). Some candidates did not colour-code or label the information conveyed by the bar chart, line graph and pie chart. In fact, the title and other essential information were not always present.
- iv). The line graph was not constructed correctly by a good number of candidates.
- v). A number of candidates constructed another bar/ column chart instead of the line graph.
- vi). Few candidates presented the pictorial bar chart and the pictorial pie chart.
- vii). Other candidates did not use colour and shading to render the poster.

1 to 11	12 to 23	Full marks	Not attempted
3	14	2	58

Chairperson
Examination panel 2022