L-Università ta' Malta

MATSEC
Examinations Board

Marking Scheme

AM Graphical Communication

First Session 2025

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Paper I

Question			Suggested Answers	Marks distribution	Marks
1			**Shortest distance between two skew lines**		
	a		Copy Figure 1b.	1	1
	b		Project a first auxiliary view to determine the true length of A_2 B_2.	3	10
			Project C_2 D_2 in the same auxiliary view.	1	
			Project a second auxiliary to view A_2 B_2 as a point A_3 B_3	3	
			Project C_3 D_3 in the second auxiliary view.	1	
			Draw a perpendicular line from point A_3 B_3 to line C_3 D_3 (shortest distance).	2	
	c		Name the shortest distance line RS, measure and state (52 mm).	1	1
	d		Project RS to the first auxiliary view.	1	4
			Project RS to the front elevation.	1	
			Project RS to the plan.	2	
	e		Determine the angle RS makes with the V.P. (10°).	1	1
	f		Determine the angle RS makes with the H.P. (35°)	1	1
	g		Find the true length of CD, measure and state (84 mm).	2	2
Total:					**20**
2			**Transition Piece**		
	a		Copy Figure 2b	2	2
	b		Project/construct a half surface development of the truncated cylinder 'A'.	2	2
	c		Draw crease lines on transition piece 'B' and label by letters and numbers.	2	2
	d		Construct the necessary true lengths.	4	4
	e		Correct sides of hexagon.	2	10
			Correct elliptical perimeter.	3	
			Correct true connection of true lengths.	5	
Total:					**20**

3			**Interpenetration**		
	a		Copy the given views.	2	2
	b		Plot the curve of intersection showing hidden details	3	10
			Plot the curve of intersection showing hidden details	4	
			Plot the curve of intersection showing hidden details	3	
	c		Project an auxiliary view at 45° to view the true shape of the square prism.	4	8
			Project the correct intersections between square and the generators of the cone to the corresponding generators in the front elevation.	4	
Total:					**20**
4			**Oblique cutting plane**		
	a		Copy the given views.	1	1
	b		Project an auxiliary view of the cone showing the oblique plane as an inclined cutting plane.	2	2
	c		Project the truncation of the cone to the plan.	4	4
	d		Project the truncation to the front elevation.	4	4
	e		Project the true shape of cut including the square hole.	3	3
	f		State and name the resulting conic section (ellipse).	1	1
	g		Locate by construction the upper focal sphere	2	2
	h		Locate the Foci and Directrix of the conic section.	2	2
	i		Derive the eccentricity of the ellipse (5/6)	1	1
Total:					**20**
5			**Graphic Statics – Roof Truss**		
	a		Copy the space diagram using a scale of 10 mm rep 1 m.	1	1
	b		Label the spaces by using the Bow's notation.	1	1
	c		Draw the polar diagram using a scale of 10 mm rep 1 kN.	4	4
	d		Determine the reaction of forces R_R and R_L.	4	4
	e		Determine graphically the forces developed in the members	5	5
	f		State which members are in tension and in compression.	4	4
	g		Organise the results in a tabulated format.	1	1
Total:					**20**

FORCES		
Member	Magnitude	Nature
BH	5.7 kN	Tie
HA	5.0 kN	Strut
IH	1.8 kN	Strut
IC	6.8 kN	Tie
IJ	7.0 kN	Strut
JG	1.3 kN	Strut
JK	9.2 kN	Strut
KD	8.3 kN	Tie
KL	1.0 kN	Strut
LE	7.7 kN	Tie
LF	6.6 kN	Strut

6			**Gears**		
	a		Calculate the necessary information and input data in table format.	4	
	b		Set the centrelines and draw the PCDs of both gears.	1	6
			Draw the pressure angle.	1	
			Draw the addendum of pinion.	1	
			Draw the dedendum of the pinion.	1	
			Construct the involute on the base circle of the pinion.	2	
	c		Construct the profile of two teeth of the pinion.	2	8
			Draw the addendum of wheel.	1	
			Draw the dedendum of the wheel.	1	
			Construct the involute on the base circle of the wheel.	2	
			Construct the profile of three teeth of the wheel.	2	
	d		Determine the base circle diameter of the pinion (Ø159).	1	2
			Determine the base circle diameter of the wheel (Ø314).	1	
Total:					**20**

GEAR DATA: Module = 14 mm, T = 24, Y = 20°			
INFO	FORMULA	GEAR	PINION
No. of teeth (T)		24	12
Module (M)		14	14
PCD	T x M	336	168
Addendum (A)	M	14	14
Clearance (C)	0.25 M	3.5	3.5
Dedendum (D)	A + C	17.5	17.5
Circular pitch (P)	π x M	44	44
Tooth thickness	P / 2	22	22
Root radius	0.1 P	4.4	4.4
Pressure angle (Y)		20°	20°

PAPER II

1			**One-point perspective drawing**		
	a		Drawing three preliminary sketches to show a clear understanding of the perspective drawing, in exploring the best position for the horizon.	3	3
	b		Constructing a well-proportioned 1-point perspective crate	5	26
			Constructing the two triangular base steps	2	
			Constructing the central step	2	
			Constructing the outline of the octagonal floor	2	
			Constructing the tiles on the octagonal floor	3	
			Constructing the left vertical wall with window	2	
			Constructing the right vertical wall with window	2	
			Constructing the U-shaped roof	3	
			Constructing the central table	3	
			Constructing the monitor with stand	2	
	c		Rendering small areas of the drawing with color	5	5
Total:					**34**

2			**Cruise liner pictograms**		
	a		Drawing preparatory sketches	6	6
	b		Drawing the final line-pictogram for bar and restaurant	2	12
			Drawing the final line-pictogram for gym	2	
			Drawing the final line-pictogram for clinic	2	
			Drawing the final line-pictogram for indoor pool	2	
			Drawing the final line-pictogram for theatre and music performance	2	
			Drawing the final line-pictogram for casino	2	
	c		Rendering one of the final drawings (black only accepted)	4	4
Total:					**22**
3			**Pictorial view of keychain and monogram**		
	a		Sketching a well-proportioned pictorial view of the four separate parts including discrete indicative arrows		10
			- lower part	3	
			- upper part	3	
			- key ring	2	
			- dowel	2	
	b		Drawing preparatory sketches for monogram	6	12
			Drawing final monogram	6	
Total:					**22**
4			**Pictorial drawing of drone**		
	a		Drawing a well-proportioned freehand pictorial of the drone		16
			- upper body	3	
			- lower body (green)	2	
			- upper camera	2	
			- front landing arms with rests and propellers	5	
			- hind landing arms with propellers	4	
	b		**Colouring**		6
			- upper body (silver grey)	2	
			- lower body (green)	1	
			- propellors (yellow)	1	
			- propellor bases (red)	1	
			- landing arms (yellow)	1	
Total:					**22**