Candidate Name	Form Class	Index Number

ANG MO KIO SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024
SECONDARY FOUR EXPRESS / FIVE NORMAL (ACADEMIC)

DESIGN & TECHNOLOGY 7059/01

Total Marks: 80 27 Aug 2024/Tuesday

Setter: Mr Victor Tan / Mr Wilson Koh 2 Hours

ANSWER SCHEME

Candidates answer on the Question Paper.

No Additional Materials are required.

Instructions to candidates:

Write your name, index number and class in the spaces at the top of this page.

Write in dark blue or black pen.

You may use a HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

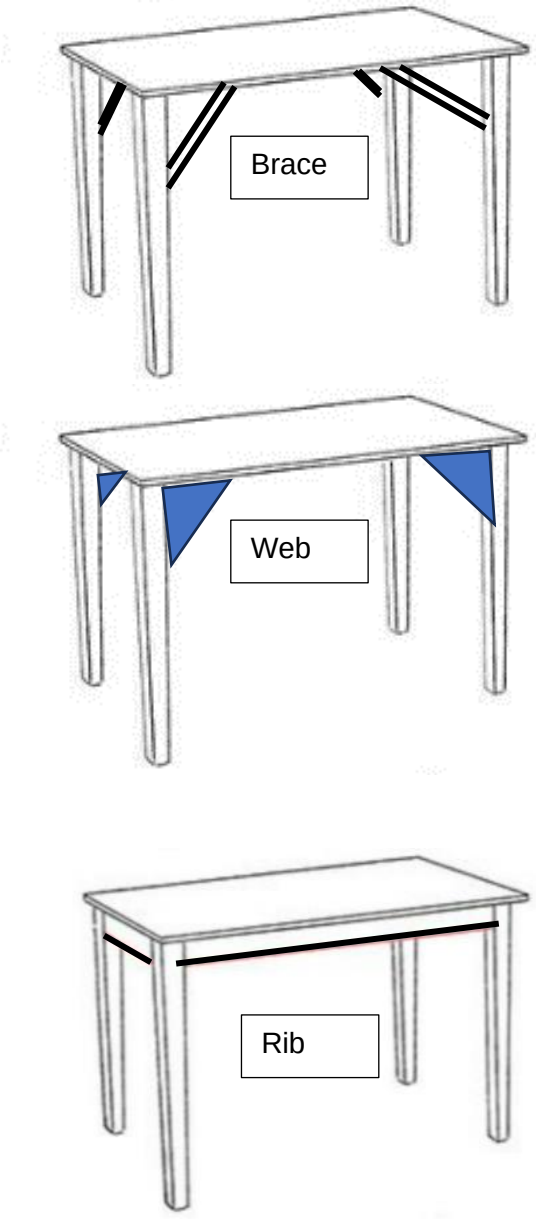
Candidates are to answer **all** questions.

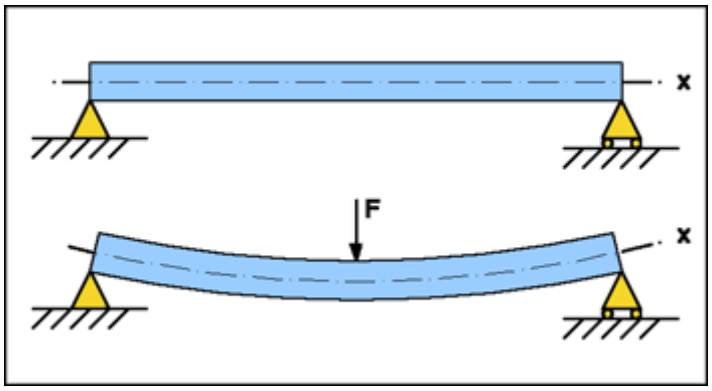
The number of marks is given in brackets [ ] at the end of each question or part question.

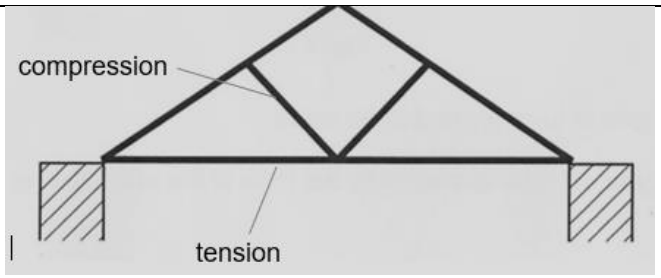
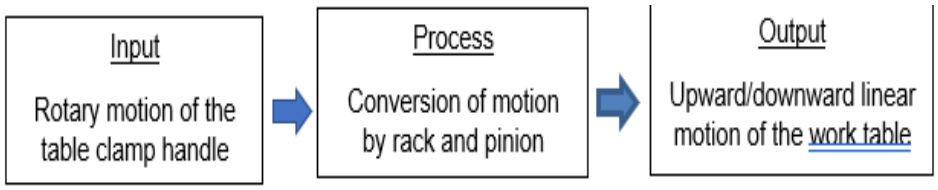
This document consists of **15** printed pages and **1** blank page.

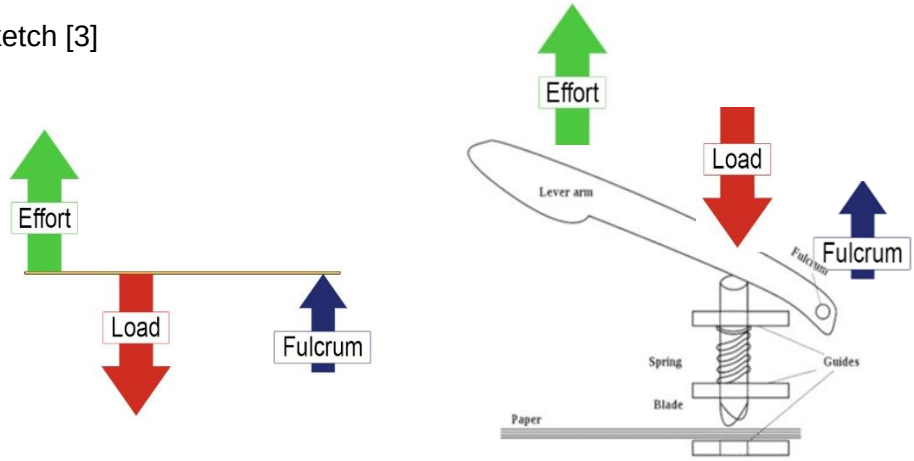
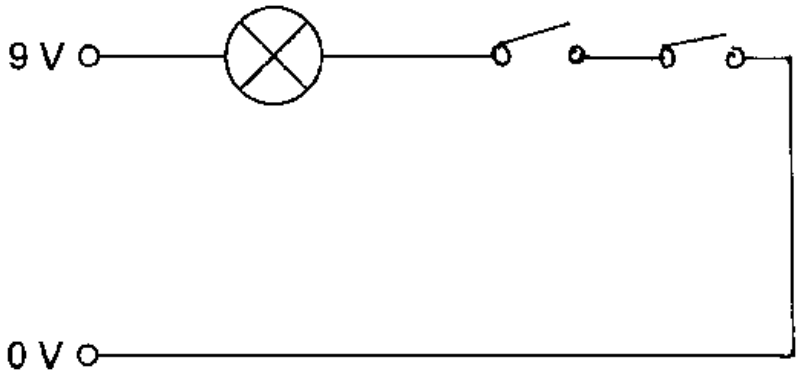
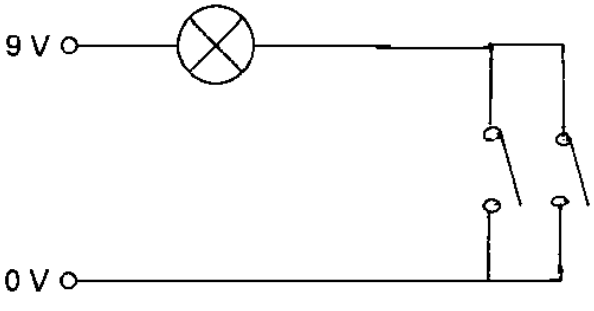
1	(a)	(i)	Identify useful features in existing products [1] that can be modified and included in the ideas. [1]	
			Identify poor features (e.g. safety related concerns) in existing products [1] that should be improved or avoided in the ideas. [1]	
		(ii)	Research using the Internet for relevant information [1]. Information such as anthropometry data can be adapted for the enhancement of safety and user's experience during usage [1].	
			Conduct surveys or interviews of the intended users [1]. Feedback from the users can be collated for further analysis which lead to further development of initial ideas [1].	
	(b)		 Function (to hold shells) – 2 Function (ease of disposal of shells) -1 Clarity (with or without annotation) - 1	
	(c)	(i)	 To hold the disposal tray [2]	 To support the bowl from below [2]
	(c)	(ii)	Tables and Charts [1]: Summary statistics (mean, median, standard deviation, percentiles) are presented in tables, while charts (histograms, scatter plots) visualize the data distribution. [1]	

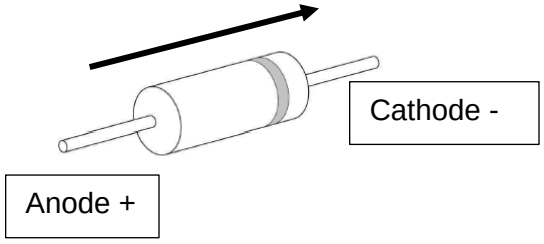
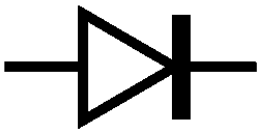
			Reports and Summaries [1]: Concise documents highlighting key findings, trends, and recommendations. [1]	
	(d)	(i)	Visualization: Helps designers and stakeholders visualize the product's appearance, layout, and functionality. Prototyping: Enables testing and refinement of ideas before investing in final production. User Testing: Allows for user feedback and usability testing. Cost Estimation: Aids in estimating production costs. Time-Saving: Identifies potential issues early, reducing costly rework. [any one of the above reasons or relevant]	
	(d)	(ii)	Cardboard is fragile and prone to damage, tearing, or bending, making it challenging to handle and test. Cardboard mockups may not accurately represent the final product's material, texture, or color, potentially misleading designers. Cardboard mockups can be difficult to scale accurately, potentially leading to proportion and sizing errors. Cardboard struggles to capture intricate details, complex curves, or precise mechanisms. Cardboard lacks the rigidity, strength, and stability of actual materials, affecting the mockup's overall performance. [any one of the above reasons or relevant]	
	(e)	(i)	Increasing complexity of the snack storage design.	[1]
		(ii)	Development of new materials, production processes and technologies help designers to realise more sophisticated forms [1] and the cost of production can be reduced with greater production efficiency [1].	[2]

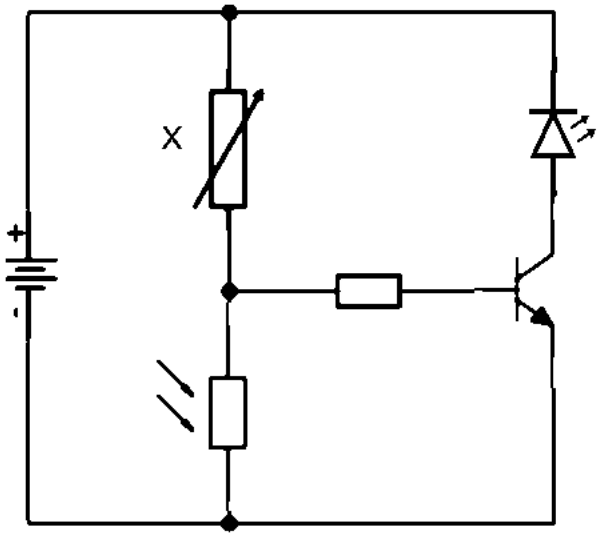
2	(a)	(i)	Possible methods to reinforce the study table to resist Force A. • Brace [1] • Web [1] • Rib [1] Sketch [2] 	[3]

2	(a)	(ii)	Type of Force: Bending [1] Sketch [2] 	[3]
2	(b)	(i)	Manmade Shell Structure	[1]
2	(b)	(ii)	Any suitable answers Plastics : High Density Polyethylene (HDPE), Polypropylene (PP), Acrylonitrile Butadiene Styrene (ABS) [1] Reason: Strong and robust, Good impact Resistant, Light weight, Many colours selection etc. [1]	[2]
2	(b)	(iii)	The helmet is made from material which has its original colours [1] and gloss finishing [1].	[2]
2	(b)	(iv)	Any possible answers Each different colour hard hat has a different meaning, and it's important we take note. The system is intended to reduce on-site dangers [1] by making it easier to note the experience and expertise of each person [1] on a construction site. Colour code is to ensure safety and identification of workers on the construction sites [1]. Assist supervisors to easily recognise specific individuals and their respective roles [1].	[2]

2	(c)	(i)		[2]
2	(c)	(ii)	Truss or Frame [1]	[1]
2	(c)	(iii)	A structure is in equilibrium when all forces/moments acting [1] on it are balanced [1]	[2]
3	(a)	(i)	Rack and pinion [1]	[1]
3	(a)	(ii)	Crank [1]	[1]
3	(a)	(iii)	There is no feedback [1] to the system.	[1]
3	(a)	(iv)		[3]
3	(a)	iv)	Sketch perspective and proportion [1] Sketch of chuck key holder design [1] Sketch of attachment method of holder to column [1] Annotation/explanation of attachment method of holder to column [1]	[4]
3	(b)	(i)	Compression Spring [1]	[1]
3	(b)	(ii)	To allow the lever arm [1] to return to its original [1] position after pressing down.	[2]

3	(b)	(iii)	2nd Class Lever [1] Sketch [3] 	[4]
4	(a)	(i)	Two SPST switches in series, lamp will lit when both switches are closed. [2] 	[2]
4	(a)	(ii)	Two SPST switches in parallel, lamp will lit if either switch is closed. [2] 	[2]

4	(a)	(iii)	Single pole single throw switch will remain closed/open [1] after the switch has been toggled [1]. A membrane switch will only be closed when it's been pressed [1] and open when released.	[4]
4	(b)	(i)	Arrow in correct direction [1] Correct labels [1]  	[2]]
4	(b)	(ii)	Correct circuit symbol. [1] 	[1]
4	(c)	(i)	Light dependent resistor (LDR) [1]	[1]
4	(c)	(ii)	LED [1] LDR [1] Transistor [1] Resistor [1]	[4]

				
4	(c)	(iii)	Component X : Variable Resistor [1] Purpose : Use to control current to adjust the sensitivity of the circuit. [1]	[2]
			End of Paper	