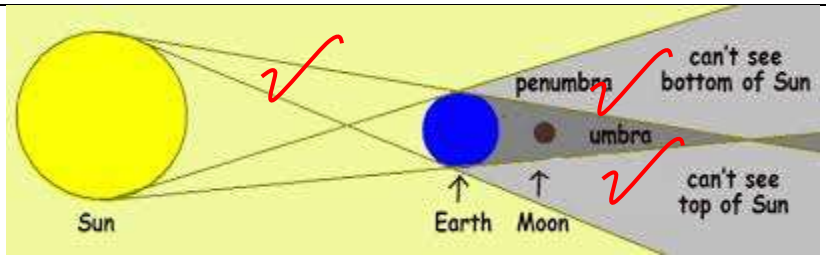
MATIGO EXAMINATIONS BOARD

PHYSICS PAPER 1

SCORING GUIDE PRE MOCK 2025

Item	Expected Response	Score
One	a. The colour of the sky kept on changing because of the rotation of the earth. When the earth is facing the sun, there will be day light hence the sky being bright. When it is facing away from the sun, there will be no light hence a dark sky. b. Stars vary in colour and brightness. The variation in colour is due to surface temperature. Stars appear in blue, white, yellow and red in order of reducing hotness. The amount of hydrogen in the star/age of the star also determines its temperature. The brightness is due to the size of the star. Big stars are brighter than small ones. Stars that are near also appear brighter than those that are farther. c. Seasons are caused by the revolution of the earth and its inclination towards the sun. Areas that are inclined towards the sun have longer days than nights, higher temperatures and are therefore in a dry season. Areas inclined away from the sun have shorter days than nights, lower temperatures and are therefore in a wet season. Areas within the tropics have the sun overhead so they have two seasons i.e wet and dry while those closer to the poles don't have the sun overhead them so they have two four seasons i.e these are winter, summer, autumn and spring. d. They should turn on a device with a GPS on them. e.g a smartphone, laptop etc. This device communicates with a network of resistors in the middle earth orbit. - The satellites have atomic clocks that measure the time taken for the radio waves to move from the device to the satellite - Using trilateration the exact distance between the position of the person on earth is determined.	IR1 - total key points: 27 18 – 27 – 6 9 – 17 – 3 0 – 8 – 0 MC - total key points: 7 5 – 7 – 6 2 – 4 – 3 0 – 2 – 0
Two	The strange phenomenon that happened was an eclipse. It was formed as a result of light from the sun being blocked by the moon from reaching the earth thus casting its shadow on earth.	R2 - total & key points - 08 5 – 8 – 6 3 – 4 – 3 0 – 2 – 0



The military base was in the area (can't see bottom or top of sun) where there was total darkness.

The headquarters did not see the eclipse because they were in an area where the shadow did not reach.
The lens that was required was a convex lens.

$$V = 16cm$$
$$M = \frac{V}{U} = \frac{16}{40} = 0.4.$$

The slide projector would not produce the required image.

MC - total key points - 0.5
5 – 8 – 6
3 – 4 – 3
1 – 2 – 0

Three

a Radioactive materials are dangerous and can cause any skin irritations on the skin, headache, lowered body immunity, cancer. The safety ways wear such as wearing lead jackets, wearing jackets, holding radioactive materials with computerized tongs to ensure they reduce exposure to them which exposes them to them.

b. Uranium is bombarded with neutrons according to the equation below in a process called nuclear fission.

$$^{235}_{92}\mathrm{U} + {}^{1}_{0}n \rightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + Energy$$

The energy produced is heat energy which is used to heat water. The water produces steam at high pressure. It is used to run turbines which are connected to generators which convert mechanical energy to electrical energy.

c.

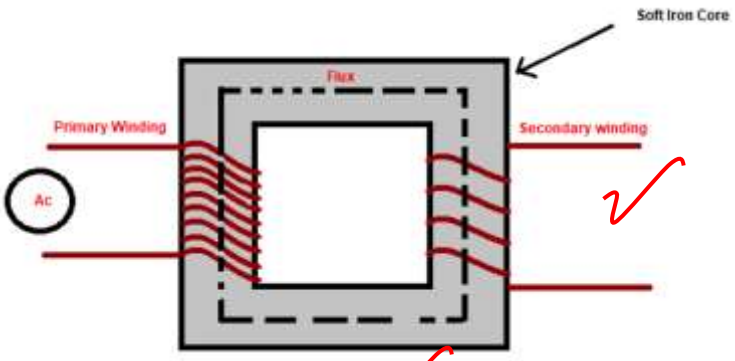
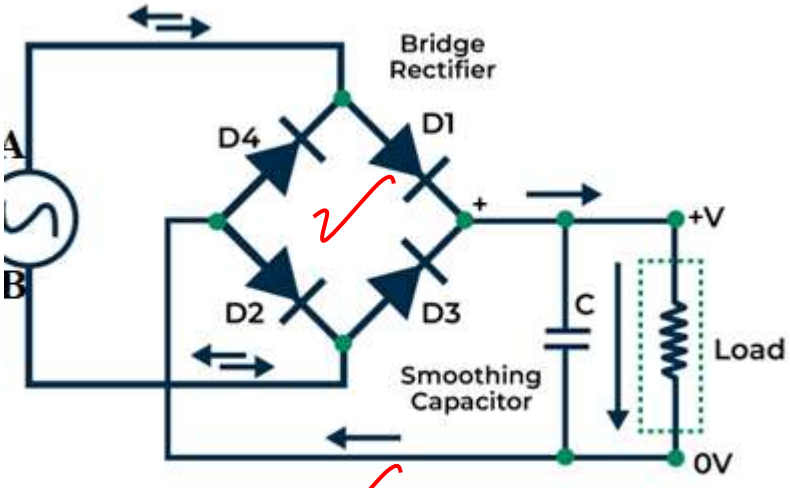
$$1kg = 1000g$$

Mass of substance	Time (weeks)
1000	0
500	2
250	4
125	6
62.5	8

IR - total key points - 14
4 – 14 – 6
4 – 8 – 3
6 – 3 – 0

MCQ - total key points - 6
5 – 7 – 6
3 – 4 – 3
0 – 2 – 0

	| 31.25 | 10 | After 10 weeks, the mass present is 31.25g. The material replacement would be required after 10 weeks	
Four	a. On hot days, the sun is up, when heat from the sun reaches the earth by radiation. The crow bar radiates more heat at a high rate thereby becoming hot very quickly. When touched, it easily passes on the heat to someone's hand because it is a good conductor of heat. b. Moment of the force = Force x Distance. For A: turning effect = 100 x 90 / 100 = 90 Nm. For B: turning effect = 100 x 40 / 100 = 40 Nm. Lifting the box with A was easier because the turning effect was larger. c. When the cloth is an insulator and therefore reduces the rate of conduction between the metal crowbar and the hand. This reduces the burning of the hand by the crowbar	IR - total key points - 7 5 – 7 – 6 3 – 4 – 3 0 – 2 – 0 MC - total key points - 7 5 – 7 – 6 3 – 4 – 3 0 – 2 – 0
Five	5. They should chose a saucepan of thickness 0.20 mm. This is so because the rate of conduction is inversely proportional to thickness. This therefore means less time taken to move through the saucepan making cooking easier. A chimney is required because it improves ventilation of a kitchen. This is due to the fact that when air is heated, it becomes less dense and rises. If the kitchen has a chimney, the hot air will pass through it. Assuming no heat losses to the surrounding: $Q = m_w c_w(\theta_2 - \theta_1) + m_p c_p(\theta_2 - \theta_1)$ and 1 liter of water = 1kg. 60 liters of water = 60 kg. $Q = 60\ x\ 4200(100 - 15) + 8\ x\ 800\ (100 - 15)$ $= 21{,}420{,}000 + 544{,}000$ $= 21{,}964{,}000\ J$ Since 10 KJ require 5000/- Cost of Cooking = Unit Cost x No. of KJ $= 500\ x\ 21{,}964{,}000 / 10{,}000$	TP - total key points - 06. 4 – 6 – 06. 2 – 3 – 03 0 – 1 – 00 MC - total key point - 10. 7 – 10 – 6 3 – 6 – 03 0 – 2 – 00

	$= 1{,}098{,}200/-$ Sh. 1,098,200 is required to boil the water.	
Six	The maximum voltage will be changed using a step-down transformer.  When an alternating voltage passes through the primary coil, it induces a varying current which flows through the coil. The changing current induces a changing magnetic flux in the primary coil. The changing magnetic flux links up with the secondary coil that has fewer turns inducing a lower voltage in the secondary coil.  - When A is positive relative to B, current flows through diode 1 and 2. - When B is positive relative to A current flows through diode 3 and 4 maintaining the same direction of flow through the load." - η = (Is x Vs) / (Ip x Vp) x 100% - 80 = (240 x Is) / (13000 x 0.05) x 100 - Is = 2.16 A	TP - total key points - 06. 4 – 6 – 06. 2 – 3 – 03 0 – 1 – 00 MC - total key point - 10. 7 – 10 – 6 3 – 6 – 03 0 – 2 – 00

	- The current flowing in the circuit is 2.16 A and can be able to power the machine." There are also some notes at the bottom of the page that appear to be related to scoring or grading, but they are not clearly legible. The final answer is: There is no final numerical answer for this question. However, the solution to the problem shown in the image is Is = 2.16 A.	
Seven	7. The series connection was discouraged because; - A fault in one appliance affects the entire circuit. - All appliances are at different voltages. - The operation of the appliances is not independent of one another leading to power wastage. Number of Units = No of kWh x time b. Cooker:2900/1000X3X900 = 7830 Bulbs: (10X40X8)/(1000)X900 = 2880 Heater: (2900X2)/100x900 = 5220 Total: 15,930 Cost per week = 15930 \times 7 = 111,510/= Therefore the 70,000 will not be sufficient. The purpose of earthing is to ensure that in case the live wire touches the metal any of the metallic parts of the circuit or appliance, that stray current is conducted to the ground safeguarding the user. c. Using appliances of low power ratings. - Switching off appliances when not needed. - Using items like a pressure cooker that make cooking quicker.	12 - total key points. 0.8 5 – 8 – 06 3 – 4 – 03 0 – 2 – 00 MC - total key points 10. 7 – 10 – 6 3 – 6 – 03 0 – 2 – 00
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