Question 1

The amount of goods and services that can be produced in an economy is insufficient to satisfy the wants of its population. This leads to the economic consequences of scarcity and choice.

(a) Explain how a production possibility curve can be used to show the concepts of underutilisation of economic resources and opportunity cost. [10]

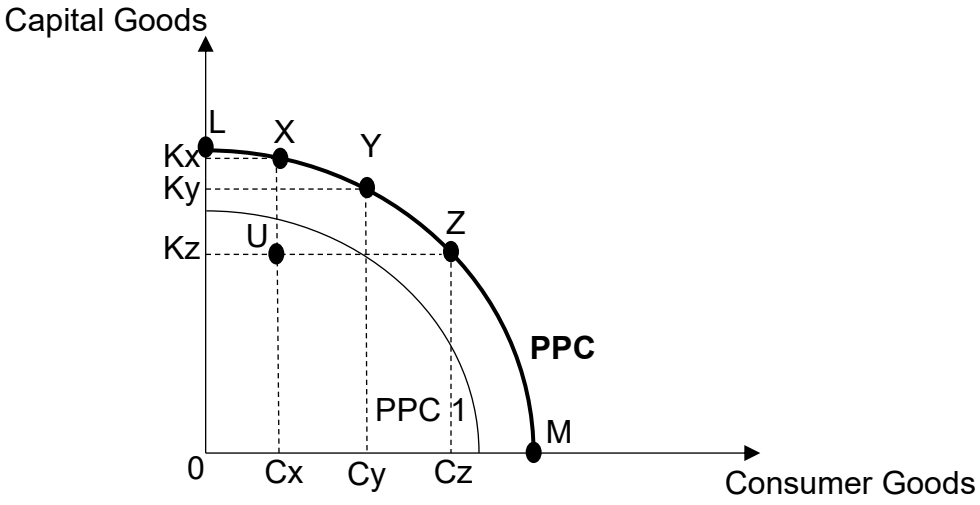
(b) Discuss whether it is possible to increase the total production of goods and services in an economy without resulting in environmental damage or other unintended consequences. [15]

Suggested Answer to Part (a):

Requirement 1: How a PPC shows the concept of underutilisation of economic resources

The Production Possibility Curve (PPC) outlines all possible combinations of 2 goods that could be produced by an economy assuming the full and efficient utilisation of a fixed quantity of resources such as land, labour, capital and enterprise in a given state of technology.

Assuming that an economy produces 2 kinds of goods – capital goods and consumer goods – its PPC is as illustrated below:



Points inside the PPC such as U show combinations of capital goods and consumer goods that the economy produces when it underutilises its fixed quantity of resources. At U, the economy produces Cx quantity of consumer goods and Kz quantity of capital goods. U represents an underutilisation of resources because the economy could have produced more capital goods at Kx (and produce the same amount of consumer goods at Cx) by operating instead at X, or produced more consumer goods at Cz (and produce the same

of amount of capital goods at Kz) by operating instead at Z, or produce more of both goods at Cy and Ky by operating at Y. Therefore, points inside the PPC represent an under-utilisation of economic resources because resources could be utilised more fully and efficiently in order to increase production towards the PPC which represents the economy's productive capacity i.e., the maximum quantities of output that it can produce at full employment.

Requirement 2: How a PPC shows the concept of opportunity cost

Scarcity arises as a consequence of unlimited wants but limited resources. As limited resources are insufficient to satisfy unlimited wants, choices need to be made regarding which wants to satisfy and which wants to forgo. Opportunity cost refers to the value of the next best alternative forgone when a choice is made.

With respect to the PPC diagram shown earlier, as the economy chooses to move from X to Y and increase the production of consumer goods from Cx to Cy, it needs to contend with a fall in capital goods production from Kx to Ky. This is because as resources are limited and fully employed, the allocation of more resources to the production of consumer goods leaves less resources for the production of capital goods. Hence Kx - Ky is the opportunity cost of increasing the production of consumer goods from Cx to Cy. The negative slope of the PPC i.e., Δ Capital Goods / Δ Consumer goods shows the concept of opportunity cost.

Moreover, due to resources being imperfect substitutes for each other and not equally adaptable to alternative uses, as the economy increases production of consumer goods and moves from L to M, resources that are increasingly unsuited to consumer good production (and increasingly suited to capital good production) are being transferred from capital good production to consumer good production. This implies increasing opportunity costs since larger and larger quantities of capital goods are forgone for every additional unit increase in consumer good production. The concavity of the PPC to the origin shows the increasing opportunity cost of consumer good production.

L3	Thorough address of both requirements / Thorough address of 1 requirement + Cursory address of the other. Answer is thorough, precise, logical, well-reasoned using theory.	8 – 10
L2	Thorough address of 1 requirement / Cursory address of both requirements. Answer is relevant to the question, but theory is incompletely explained.	5 – 7
L1	Both requirements hardly addressed / Cursory address of 1 requirement. Some knowledge shown but does not indicate that the meaning &/or requirements of the question has been properly grasped. Basic errors of theory or an inadequate development of analysis. Mostly irrelevant and only contains a few valid points made incidentally in an irrelevant context.	1 – 4

Suggested Answer to Part (b):

Requirement 1: Use a PPC to explain how an increase in the total production of goods might be achieved

An increase in the total production of goods would suggest **actual economic growth** taking place in the economy It is measured by percentage increase in real Gross Domestic Product (GDP) and is shown by a movement of a combination within the PPC to a combination that is either closer or on the PPC. E.g. from point U to points Y or Z. The economy would now produce more of both consumption and capital goods.

It is also possible for an economy to enjoy an increase in the total production of goods through **sustained economic growth**, which refers to higher real output (actual economic growth) accompanied by lower price level. It occurs when actual growth is accompanied by an increase in potential capacity/ **potential growth** which is illustrated as an outward shift of the PPC, from PPC to PPCx. Hence, the economy is capable of producing more consumption and capital goods, from Cy to Cx and Ky to Kx respectively.

Potential economic growth/ an outward/rightward shift in the PPC from PPC to PPCx can be caused by an increase in quantity &/or quality of productive resource or an improvement in the state of technology. For example, an improvement in labour productivity through Singapore's SkillsFuture or an advancement in technology through adoption of Artificial Intelligence.
Assuming that the aggregate demand (AD) in the economy is high enough, potential growth will allow the economy to produce a previously unattainable combination of output as it is now possible to produce more from a given resource base, from combination Y to combination X.

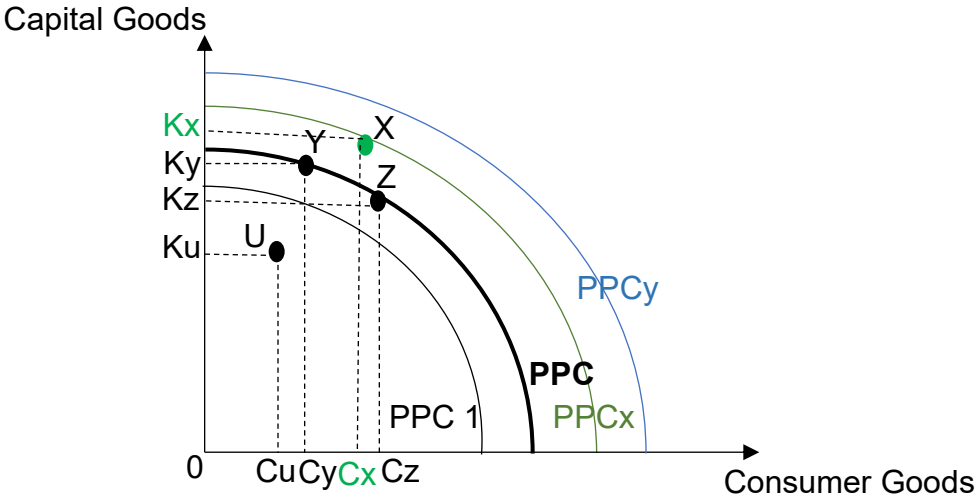
Requirement 1 Evaluation:
The extent of increase in total production of goods enjoyed by an economy could be dependent on various factors, from the size of the multiplier to the other context of the economy. As a small and open economy, Singapore faces a small multiplier, k, where k = 1 / MPW, (MPW = marginal propensity to withdraw) due to the large withdrawals in terms of a high marginal propensity to save (MPS) and marginal propensity to import (MPM). The high saving rate is due to its compulsory savings via Central Provident Fund (CPF) contributions by their people and the high imports of raw materials and final goods is due to its lack of natural resources. It is thus difficult for Singapore to raise its total production of goods to its desired level as its AD is not likely to increase by the full extent. The size of k is likely to be a significant limiting factor to the effectiveness of a very expansionary demand management policy to generate actual growth and increase its production of goods, even in times of recession.

Requirement 2A: Increase total production of goods and services results in environmental damage

The production of goods and services requires the input of economic resources such land, labour, capital and enterprise into the production process. The increase in total production of goods and services may speed up the depletion of non-renewable resources such as primary products like minerals, oil, forestry and also deterioration in the environment by destroying natural beauty and causing water & air pollution and climate change.

Such external costs are usually ignored as firms only consider their own private costs and benefits in their pricing and output decisions and produce up to where their MPC = MPB in order to maximise their profits. Since social costs exceed private costs, these goods will therefore by underpriced resulting in overproduction and overconsumption relative to the socially optimal level where MSC = MSB, exacerbating the extent of environmental damage.

Environmental damage and resource depletion without any renewal or replacement reduces the future stock of resources for an economy. With a reduction in the future quantity of economic resources which an economy can employ for the production of goods and services, the future productive capacity of the economy shrinks and is diagrammatically represented by a leftward shift of the PPC to PPC1 as shown below.



This above is particularly true for countries that do not have laws or do not effectively enforce the laws relating to pollution and improper usage of resources. In such cases it is not possible to increase the total production of goods and services in an economy without resulting in environmental damage. In fact, a decrease in total production of goods and services in the future will almost certainly follow as a result of a current increase in total production.

As a consequence of the environmental damage that arises from increasing total production, material and non-material living standards of future generations may worsen as the latter may enjoy less goods and services (due to decrease in ability to produce as quantity of resources fall) and have to live with a worsening environment. There is hence a trade-off between current and future living standards.

Requirement 2A Evaluation: However, since developing countries such as Uganda are the countries that tend to have weaker laws against environmental degradation, such impact on the future PPC and production is likely to be felt on the ground in the very long term as such countries typically underutilise their resources and operate at U with room to increase production for the foreseeable future even with the reduction in productive capacity from PPC to PPC1.

In addition, advancement of technology especially in countries that are more developed such as Italy or the United States has made possible the production of goods from recycled materials such as shoes from recycled plastic bottles. This slows down the rate of resource use and the extent of environmental damage allowing the natural environment more time to renew itself. Such production methods help preserve the current stock of resources by recycling waste and so prevent or at least slow down the leftwards shift to PPC1 due to environmental degradation and resource depletion.

OR

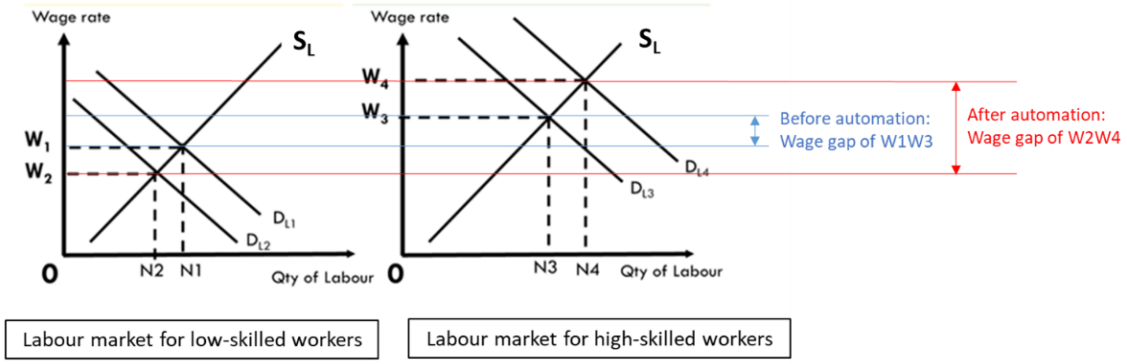
Requirement 2B: Increase total production of goods and services results in other unintended consequences

Increasing total production of capital goods as opposed to consumer goods may also have unintended consequences on current and future material living standards. Capital goods aid in future production and so add to an economy's capital stock allowing it to produce more in the future, whereas consumer goods are produced for consumption in the current period. Combination Y has more capital goods but less consumer goods than Z – Cz - Cy is the opportunity cost due to scarcity of increasing production of capital goods from Kz to Ky. An economy that chooses to increase production from U to Y will see a larger increase in its future productive capacity to PPCy (compared to PPCx) and so enjoy higher future material living standards than if it chooses to increase total production from U to Z. However, the larger increase in future material living standards is at the expense of current material living standards as increasing production to Y instead of Z results in a smaller increase in consumer goods. Hence increasing from U to Y implies a smaller increase in current material living standards but a larger increase in future material living standards compared to increasing from U to Z – there is a trade-off between current and future material living standards.

Increasing total production of goods and services could be brought about by automation and other forms of technological advancement that increases efficiency and productivity allowing more output to be produced per man-hour. This could lead to unintended consequences such as the worsening of income inequality between high- and low-skilled workers as automation replaces low-skilled workers and increases demand for high-skilled labour to operate machines and equipment.

Low-skilled workers:

- Automation → decrease DD for low-skill workers from DL1 to DL2 → surplus of low-skilled workers at W1 → downward pressure on wage
- As wages fall → surplus shrinks until it is total eliminated at W2 where wage is lower compared to W1 (and quantity of employed low-skilled workers is lower at N2 compared to N1)



High-skilled workers:

- Automation → increase the need of high-skilled workers to operate the machine → increase the DD for high-skilled workers from DL3 to DL4 → shortage of workers at W3 → upward pressure on wage
- As wages increase → shortage shrinks until it is total eliminated at W4 where wage is higher compared to W3 (and quantity of employed high-skilled workers is higher at N4 compared to N3).

As automation depresses wages of the low-skilled while augmenting those of the high-skilled, wage gap worsens from W1W3 to W2W4 → worsen income inequality

Requirement 2B Evaluation: However, if there are policies in place such as subsidies for training and education to equip workers with necessary skills to operate machines and equipment as production processes are increasingly automated → improve occupational mobility → fall in SS of low-skilled skilled workers and rise in SS of high-skilled workers → income inequality may not worsen. Assuming the government has the foresight in identifying the right skills to train its labour force and future generations in, income inequality may worsen to a smaller extent as a result of increasing production through the use of automation and technological advancement. Yet, some worsening of income inequality is still expected as there will be segments of the population (disabled, elderly) who face difficulties acquiring new skills. Moreover, acquiring of skills and translating to improved productivity takes time, so in the short run the low-skilled will still likely face a fall in income &/or lose their jobs.

Summative Conclusion:
In conclusion, increasing total production will most certainly result in environmental damage and other unintended consequences to some degree as governments, firms and households are bound by scarcity, choice and opportunity cost. However, the extent depends on the composition or nature of the goods and services produced, how they are produced and government response or policy. With the increasing spotlight on

sustainable and inclusive economic growth, countries are more mindful of the consequences of increasing production at all costs and are gradually replacing that model with one that focusses on sustainability over the longer term and inclusiveness of all segments of society especially those who tend to be marginalized as the economy digitalizes – this should see the extent of environmental damage and other intended consequences reduce over time.

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E3	For an answer that builds on appropriate analysis to evaluate contemporary issues, perspectives and policy/strategy choices, that recognizes unstated assumptions and evaluates their relevance, and that synthesises economic arguments to arrive at well-reasoned judgements and decisions.	5
E2	For an answer that makes some attempt at evaluation or a conclusion that answers the question but does not explain the judgement or base it on analysis.	3 – 4
E1	For an answer that gives superficial evaluative statement(s) without supporting analysis and elaboration.	1 – 2