Q1:

1.	A
2.	B
3.	C
4.	A
5.	A
6.	A
7.	B
8.	B
9.	A
10.	B
11.	B
12.	B
13.	C
14.	C
15.	C
16.	A
17.	C
18.	B
19.	C
20.	B
21.	B
22.	A
23.	B
24.	B
25.	C
26.	A
27.	B
28.	A
29.	A
30.	B
31.	C

32.	B
33.	C
34.	B
35.	B
36.	C

Q2:

a.

As GYM is not responsible for the sourcing of "*all packaging and other ingredients (like cane sugar, juices, flavorings, herbs etc. for their ready-to-drink yerba mate beverages)*", the analysis will be focusing on how GYM can ensure and assure that SBP has the needed loose-leaf yerba mate for the production. This analysis is especially relevant as SBP has prior ran out of the yerba mate. Accordingly, I will be calculating the EOQ and the ROP both prior to the new contract with 7-eleven and after the new contract with 7-eleven to illustrate how the order strategy should have looked and how it should look based on the increased demand. As table 2.3 states season demand of loose-leaf mate in kg, it does not matter for GYM whether it is used for canned beverage, bottled beverage or loose leaf mate and it will therefore be treated equally. All three are for the total demand of 159,900 kg of loose leaf mate yearly.

First, EOQ and ROP will be calculated prior to the establishment of the new contract:

$$Q^* = \sqrt{\frac{2DS}{H}}$$

$$H = annual\ holding\ costs\ per\ kg = 5\%\ of\ final\ products = 5\% * 88{,}166{,}000 = \frac{4{,}408{,}300}{159{,}900}$$

$$= 27{,}57$$

$$S = Cost\ to\ place\ a\ single\ order = 2{,}000\ per\ shipment + 4{,}000\ per\ TEU$$

$$D = annual\ demand = 159{,}900kg$$

$$Q^* = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2 * 159{,}900 * 6{,}000}{27{,}57}} = 8{,}342.64kg\ per\ order$$

$$ROP = \bar{d}\bar{L} + SS = \bar{d}\bar{L} + z\sqrt{\bar{L}\sigma_d^2 + \overline{d^2}\sigma_L^2}$$

$$\bar{d} = average\ demand\ per\ time\ period = \frac{159{,}900}{12} = 13{,}325$$

$$\bar{L} = average\ lead\ time = 30\ days = 1\ time\ period$$

I will be assuming the average lead time is 30 days with a variance of 1.15 as stated in the text. 30 days will be assumed to equal one month

$$\sigma_d^2 = variance\ of\ demand\ during\ time\ period = 0.75841$$

$$\sigma_L^2 = variance\ of\ lead\ time = 1.15$$

$$z = number\ of\ standard\ deviations\ above\ the\ average\ demand\ during\ lead\ time = 95\%$$
$$= 1.65$$

$$ROP = \bar{d}\bar{L} + SS = \bar{d}\bar{L} + z\sqrt{\bar{L}\sigma_d^2 + \overline{d^2}\sigma_L^2}$$

$$= 13{,}325 * 1 + 1.65\sqrt{1 * 0.75841 + 13{,}325^2 * 1.15} = 23{,}577kg$$

As based on above calculations, GYM's EOQ is 8,342.64kg per order or equivalent to 334 bags of 25kg of yerba mate. Hereto, GYM's ROP is 23,577kg and GYM should therefore send over 334 bags of yerba mate from its Brazilian plant to the processing in California whenever the inventory in California of yerba mate hits 23,577kg.

b.

As elaborated in answer a., GYM should send over 334 bags of yerba mate from Turbo in Brazil to SBP in the United States whenever the inventory in the United States hits 23,577kg of yerba mate. However, this is prior to the increased demand from 7-eleven. Assuming that "7-eleven requires GYM to double manufacturing capacity for their ready-to-drink yerba mate" refers to doubling canned beverage demand from 25 million yearly to 50 million yearly and doubling bottled beverage demand from 25 million yearly to 50 million yearly, while holding loose leaf mate demand stable, this will increase demand from the Brazilian Turbo plant from 159,900kg yearly to 309,900kg.

* Assuming variance stays the same

$$Q^* = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2 * 309{,}900 * 6{,}000}{27{,}57}} = 11{,}614.22kg\ per\ order$$

$$ROP = \bar{d}\bar{L} + SS = \bar{d}\bar{L} + z\sqrt{\bar{L}\sigma_d^2 + \overline{d^2}\sigma_L^2}$$

$$25{,}825 * 1 + 1.65\sqrt{1 * 0.75841 + 25{,}825^2 * 1.15} = 45{,}695.47kg$$

After the increased demand from 7-eleven, GYM should instead send over 465 bags of yerba mate from Turbo to SBP whenever the inventory hits 23,577kg at a service level of 95%. This will ensure that SBP is able to produce the final products at a higher service level, ensuring that stock outs at the retail stores rarely happen.

c.

In order to better understand GYM's financial position, I will be calculating some of the most important KPIs revolving GYM.

$$Gross\ profit\ margin = \frac{sales - COGS}{sales} * 100 = \frac{88{,}166{,}000 - 26{,}449{,}800}{88{,}166{,}000} * 100$$

$$Gross\ profit\ margin = 70\%$$

A gross profit margin of 70% is definitely in the higher end, but considering the company's industry this is well with-in what we would normally expect in such an industry. Beverage companies incur especially many costs related to the distribution and marketing of the product. This can also be seen for GYM as their net profit is 7.5 million. It is therefore clear that the company incurs a lot of costs between the gross profit and profit, as we would expect from such a company in that kind of industry.

$$Profit\ margin = \frac{profit}{sales} * 100 = \frac{7{,}500{,}000}{88{,}166{,}000} * 100 = 8.51\%$$

It is difficult to conclude much solely based on the profit margin without being able to see the entire picture nor see industry comparables. Relatively speaking, 8.51% profit margin is satisfying. However, if we instead look at how GYM's C2C looks it gets much more worrying (I am assuming the numbers written in the text are correct: AR = 7,350 million = 7.35 billion, AP = 3,640 million = 3.64 billion).

$$C2C = DSO + DIH - DPO$$

$$DSO = \frac{avg.AR}{\left(\frac{sales}{365}\right)} = \frac{7{,}350}{\left(\frac{88.166}{365}\right)} = 30{,}428\ days$$

$$DPO = \frac{avg.AP}{\left(\frac{COGS}{365}\right)} = \frac{3{,}640}{\left(\frac{26.450}{365}\right)} = 50{,}231\ days$$

We do not have enough information to calculate DIH as we do not know the avg. inventory. One could argue that inventory is counted from when it is dispatched from Turvo. In that case, avg. inventory would be:

$$DIH = \frac{avg.inventory}{\left(\frac{COGS}{365}\right)}$$

Average period for transport = 30 days

Average processing time in SBP = 10 days

Therefore average DIH would be = 40 days

$$C2C = 30{,}428 + 40 - 50{,}231 = -19{,}763$$

These numbers are simply unrealistic and are likely due to an assumed mistype of the accounts receivable and accounts payable in the text. If the numbers were supposed to be in millions, C2C would instead be:

$$C2C = 30.4 + 40 - 50.2 = 20.2$$

Other relevant metrics to calculate may include inventory turnover. As we already know DIH, we can simply say $\frac{365}{40} = 9.12$. Therefore, GYM's inventory turnover is 9.12.

d.

In order to better meet the contract of 7-eleven, it may be relevant to look at whether it makes sense to either internalize, build out, or diversify its manufacturing. Currently, the company is extremely reliable on a single manufacturing facility in California. On the positive side, this may mean that the company is able to have an efficient, lean supply chain ensuring lowest unit costs possible. On the flip side, the company is extremely reliable on a single supplier and may accordingly be victim of the supplier showing opportunistic behavior due to the favorable position. Accordingly,

GYM may work to either create a long-term contract with SBP to ensure that it does not become victim of such opportunistic behavior or look towards internalizing the manufacturing. According to the make-or-buy matrix, companies should outsource only if it deems that it has a low relative competence in the process and it has a low strategic importance. Arguably, the manufacturing of the yerba mate into RtB-drinks can be deemed strategically important and GYM should accordingly treat SBP as a "Main Supplier". As highlighted above, this may mean creating long-term contracts or ensuring alignment of interests in order to work towards a common goal.

One may additionally look towards geographically diversifying its manufacturing toward other regions in North America, for example lower cost manufacturing locations on the East coast. This may allow the company to operationally hedge against disruptions at the Californian site, utilize location advantages from other regions (as highlighted in the OLI framework) and decrease lead time for customers, ensuring fewer lost sales as an effect of increase OSA.

Q3:

In order to accurately understand how supply chains, supply chain management and logistics have changed throughout time, it is integral to have a formal definition of the terms as a foundation for the discussion. A supply chain is the network of organizations involved, throughout upstream and downstream activities, in the process of creating value for the ultimate consumer. Supply chain management is, therefore, the planning, collaboration, and strategizing of maximizing this value via awareness, configuration, coordination and adaptation. Logistics more specifically refers to the supply chain part of transporting goods and services to the right person, at the right time, in the right way and includes both outbound and inbound logistics. In order to correctly encapsulate the entirety of the supply chain, it is crucial to think holistically about the interconnectedness and interdependence of its parts. Hereto, the corporate strategy must be in alignment with the supply chain strategy in order to effectively create value for the ultimate consumer. Taking the perspective of Porter's generic strategies, which encapsulates whether the competitive advantage of the company is differentiation-based or cost-based and whether it has a broad or narrow focus, it is important to have the strategy in alignment with the supply chain strategy. For example, if the company pursues a cost-based strategy, it is crucial that the supply chain strategy is aligned with that, for example by focusing on the leanness of the supply chain instead of focusing on having an agile supply chain.

Focusing on logistics, it is crucial that the outbound and inbound logistics work in alignment with the supply chain as a whole. While the early days of supply chain management were characterized by the belief that SCM was a term within logistics, the traditionalist view, it is more commonly believed now that SCM encompasses logistics. Logistics focuses on the movement of goods and its integration into the wider supply chain. Logistics is divided into two parts: i) inbound, and ii) outbound. Firstly, logistics focuses on the transportation of the goods to the point of use in the supply chain. It therefore encompasses items such as lead time and transportation where one of the most central questions includes the choice of transportation: sea, rail, road, air. One must hereto question the importance of time vs. cost and the choice ultimately comes down to the transport sensitivity of the good in question: volume to value ratio. For example, goods such as semi-conductors have a low transport cost penalty while things such as cement have a high transport cost sensitivity. The second part of logistics refers to the outbound logistics. This involves things such as terms of transportation and terms of trade: Incoterms. As mentioned in the first paragraph, it is crucial to continuously align strategies of the supply chain with the overall company's strategy. Relating to outbound logistics, this may mean that a company pursuing a cost-based strategy should look toward minimizing its logistic costs via Incoterms such as EXW instead of DAP. It is therefore crucial to continuously reevaluate the entirety of the supply chain based on the overall corporate strategy, and therefore, to think holistically.

Since the focus on the transportation of goods took off in the 1960s, as an effect of decreased trade barriers, increased utilization of information services and containerization, companies have increasingly worked towards creating more efficient supply chains. The decreased transportation costs, liability of foreignness and decreased costs of communicating across distances created ever-more global and ever-more interconnected supply chains. However, as an effect of the covid-19 pandemic it was evidenced that the lean and efficient supply chains of the past often were susceptible to disruptions, as an effect of the interconnectedness and the network's many nodes. The covid-19 pandemic, an unknown unknown or known unknown (depending on how you see it), has for many companies highlighted an exposure and issues which they never thought were present, or at least not to such a degree. As the immobility of people and goods during the pandemic cost companies millions in both reputation and relationships, companies are now working to ensure that such exposures are mitigated in the future. Operational hedging and resilience in the supply chain are now ever-more relevant. One example is the Danish WTG-manufacturer Vestas, who are working extensively on ensuring the resilience of its supply chain as it failed to supply its turbines on time during the pandemic, costing the company millions. To solve this, Vestas has done several things. Firstly, the company has increased modularity of its products in order to decrease holding costs and

decrease the likelihood of inventory becoming outdated. Secondly, the company has committed to strategic alliances with crucial components. Viewing this decision through the Kraljic matrix, which plots supply risk on the x-axis and impact on profit on the y-axis, it is argued that the covid-19 pandemic has caused a movement to the right toward increased supply risk. This analysis resembles with Vestas as they are working on both strategic alliances with crucial profit-impacting products and working on multisourcing for components with large supply risk. It is therefore clear that companies are increasingly working towards the transition from lean effective supply chains toward more agile supply chains, for example via reshoring to reduce lead time or multisourcing to decrease the dependency on specific production sites. However, the future remains ever-more uncertain with political instability as an effect of the Ukraine-war and increased techno-nationalism, as illustrated by the reshoring of high-tech items such as semi-conductors or battery production.