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Passage No. 110

Direction: Study the following information carefully and answer the question given below.

Paragraph 1: The automotive industry is quietly but resolutely preparing for the electric vehicle (EV) revolution. No less than 22 original equipment manufacturers (OEM) for automobiles have registered themselves as EV manufacturers in the last three years and they plan to manufacture 77 EV variants. At the same time, we have seen a lot of debate about India's EV vision. The **dominant** belief is that India will need both internal combustion and EV technologies to survive and coexist. There are many reasons for this belief to have taken shape; but this piece aims to focus on the issue of batteries.

Paragraph 2: Whether it is pure EVs or hybrids, the one thing common among them is the battery—what really makes the vehicles electric. The lithium-ion batteries, based on various chemistries of lithium, are widely considered to be a long-term constituent of all EVs. However, the EV vision often assumes that batteries will be available in plenty at unprecedented low price points, and this hypothesis in turn assumes that the basic constituents of lithium-ion cells will always be available in surplus. Often, the unappreciated risk to any growth story is the strain on resources that are critical for driving growth. A recent A T Kearney study, in fact, firmly establishes that the supply of core elements that make up the lithium-ion batteries, including lithium and cobalt, will increasingly become a cause of concern. While the global supply just does not seem sufficient for cobalt, the ability to mine and extract lithium could prove to be a bottleneck.

Paragraph 3: Not surprisingly, the demand for, and prices of, cobalt have increased steadily since 2016, from less than \$30,000 per metric ton (MT) to \$60,000/MT. They are now breaching the \$90,000/ MT mark. In addition, reports of electronic OEMs attempting to procure cobalt directly from miners indicate a looming supply shortage. Lithium, on the other hand, has demonstrated a similar trend—while prices only doubled from around \$4,000/MT to \$8,000/MT between 2011 and 2016, they have shot up spectacularly to higher than \$16,000/MT levels between 2016 and early 2018. These trends pose a formidable challenge to India as our country depends largely on global markets for supply of these metals. Given the limited availability, it becomes important to look at newer energy storage technologies that can find a use in mobility applications. This could mean non-cobalt-based lithium chemistries or new storage technologies. Also, lithium batteries still have usable life left after reaching the end of mobility applications, which means they can potentially find a second life when they can be put to stationary applications.

Paragraph 4: Planning for reuse of “end-of-life” batteries should, in fact, be a part of any electric mobility business case. Even after second use, batteries will finally come to the end of their useful life. What happens when the internal chemistry exhausts all its cycles? Battery recycling, especially for lithium batteries, is still at an early stage globally. Any economy that aspires to push automobile

electrification, among other uses of batteries, will need to think about the economics of end-of-life batteries. In India, the traditional lead-acid battery business successfully created a parallel industry of battery breaking units and recycling. Operating these was relatively easier; but handling lithium and its chemistries is a different ball game altogether. Globally, however, there are some signs of progress in lithium recycling processes. Belgian recycling group Unicores today operates a dedicated recycling facility with a capacity of 7,000 tons per year—equivalent to 35,000 EV batteries. US market leader Retrieiv, which operates three sites, and Tesla’s Gigafactory, will have on-site recycling and refurbishment facilities. What we need now is to step back and think about creating the ecosystem of enabling businesses that focus on four key factors necessary for EV growth: raw material supply, reuse, recycling and resale.

Questions:

1. Why is there a lot of debate about India’s EV vision?

- A. A section of the society is against the adoption of EV technology.
- B. There are doubts about the claims of vehicular pollution leading to global climate change.
- C. India is not prepared to make a switch to EV technology at present and needs to employ both EV and the present technology together.
- D. The number of original equipment manufacturers in India are too less to adopt this technology sustainably.
- E. None of the above

2. Which of the following is/are synonyms of **dominant**?

- I. Authoritative
- II. Superior
- III. Alternative
- IV. Heritable

- A. Only II
- B. Only I and II
- C. Only II, III and IV
- D. Only I, II and III
- E. All of the above

3. What is the major issue with respect to the use of lithium-ion batteries?

- A. The batteries would be available in plenty in the times to come and there would thus be a drop in prices due to increase in supply.
- B. The basic materials to build the batteries would have to be mined from the Arctic.
- C. It may not be feasible to procure the batteries owing to Intellectual Property Rights related issues.
- D. The supply of the basic materials that make up the battery are expected to drop in the future, leading to an increase in prices.
- E. None of the above

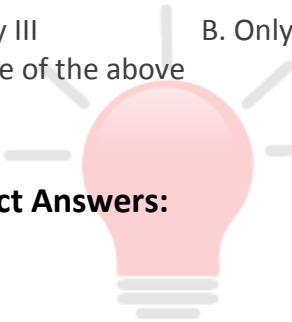
4. As per paragraph 3, what are some ways the limited availability of these batteries can be managed?

- A. Scrap the plan for using EV vehicles in India.
- B. Look for other technologies that can be used as a substitute.
- C. Make a plan for sustainable disposal of used batteries.
- D. We should start mining for these metals
- E. None of the above

5. Which of the following is/are true as per paragraph 4?

- I. Recycling the lead-acid battery is similar to recycling lithium ones.
- II. Re-using batteries is a fundamental part of the mobility business.
- III. Recycling lithium batteries is still at an early stage globally.

- A. Only III
- B. Only I and II
- C. Only II and III
- D. Only I and III
- E. None of the above



Correct Answers:

1	2	3	4	5
C	B	D	B	A

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Explanations:

1. Refer to: 'At the same time, we have seen a lot of debate about India's EV vision. The dominant belief is that India will need both internal combustion and EV technologies to survive and coexist.'

Option C matches well with this. The rest are absurd.

Hence, option C is correct.

2. **Dominant:** having power and influence over others.

Eg: They are now in an even more dominant position in the market.

Both I and II are synonyms while III and IV are irrelevant.

Hence, option B is correct.

- 3.** Refer to: 'However, the EV vision often assumes that batteries will be available in plenty at unprecedented low price points, and this hypothesis in turn assumes that the basic constituents of lithium-ion cells will always be available in surplus. Often, the unappreciated risk to any growth story is the strain on resources that are critical for driving growth. A recent A T Kearney study, in fact, firmly establishes that the supply of core elements that make up the lithium-ion batteries, including lithium and cobalt, will increasingly become a cause of concern.'

As per the highlighted fragments, only option D fits in.

Option A is opposite to the correct answer while options B and C have not been mentioned.

Hence, option D is correct.

- 4.** Refer to: ' . Given the limited availability, it becomes important to look at newer energy storage technologies that can find a use in mobility applications. This could mean non-cobalt-based lithium chemistries or new storage technologies.'

As per the fragment stated above, option B is the best fit.

Option A is extreme while options C and D have not been mentioned.

Hence, option B is correct.

- 5.** Refer to:

I. 'In India, the traditional lead-acid battery business successfully created a parallel industry of battery breaking units and recycling. Operating these was relatively easier; but handling lithium and its chemistries is a different ball game altogether.'

I is incorrect.

II. 'Planning for reuse of "end-of-life" batteries should, in fact, be a part of any electric mobility business case'

II is incorrect as the paragraph states that it *should be* an integral part and not that it is.

III. 'Battery recycling, especially for lithium batteries, is still at an early stage globally.'

III is correct.

Hence, option A is correct.



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