(SOLUTION) Mock Test 7 (Prelims Revision Test 1)

1 Correct Answer : A

Answer Justification :

Justification: Statement 1: A thermal battery is an exceptionally reliable source of specific energy. It is a non-rechargeable, single use battery that is completely inert before being activated.

- It can be stored without requiring maintenance for 15 years and then brought into use at any time, requiring only several tenths of a second before it is ready for use.
- Activation is effected internally either by mechanical or electrical ignition. Certain batteries can also be activated automatically, for example through an accelerating effect or a sudden increase in temperature.
- It can function under severe climatic and mechanical environments. Its intrinsic qualities mean that it is impervious to high stresses, sudden shocks and sharp pressure drops.
- Thermal batteries can supply the highest level of specific powers available on the market. It is also possible to provide several output voltages from a single battery.

Statement 2: A thermal battery provides its power not by converting thermal energy to electrical energy, but from a reactive electrochemical couple. Discharge is either terminated by exhaustion of the cell materials or by solidification of the electrolyte upon cooling.

Statement 3: Thermal batteries are classified as non-explosive and non-pyrotechnic equipment items for the purposes of transport and storage as for UN regulation. They can be handled without risk and destroyed by conventional means.

India has become home to the world's first-ever thermal battery plant. The thermal battery facility, inaugurated in Andhra Pradesh, will be owned by Bharat Energy Storage Technology Private Limited (BEST).

Learning: How it Works: This is an extension of explanation for Statement 2:

The thermal battery is composed of a series of cells each one having an anode, electrolyte, cathode and a heating pellet. The electrolyte, which functions as a separator between the anode and the cathode, remains solid and non-conductive until activation.

The battery remains completely inert while being stored. In each battery, the necessary number of cells is connected in series or parallel, or a combination of both, in order to produce the required voltage level(s).

At the moment of activation the pyrotechnic material (heat source) is ignited and releases energy into the cells. The temperature increases, the electrolyte melts and ion exchange takes place: the power in the cell is thus liberated.

The electrical current is transmitted through the terminals to external cabling to provide the energy required to the load.

- Pyrotechnics is the science of using materials capable of undergoing self-contained and selfsustained exothermic chemical reactions for the production of heat, light, gas, smoke and/or sound.
- Pyrotechnics include not only the manufacture of fireworks but items such as safety matches, oxygen candles, explosive bolts and fasteners, components of the automotive airbag and gas pressure blasting in mining, quarrying and demolition.

Q Source: Additional Research:

http://www.insightsonindia.com/2018/08/08/insights-daily-current-affairs-08-august-2018/

http://www.asb-group.com/sites/default/files/FICHE-9-GB_ASB.pdf

2 Correct Answer : B

Answer Justification :

Learning: Consumption, production, and investment decisions of individuals, households, and firms often affect people not directly involved in the transactions. Sometimes these indirect effects are tiny.

- But when they are large they can become problematic—what economists call externalities. Externalities are among the main reasons governments intervene in the economic sphere.
- In the case of pollution—the traditional example of a negative externality—a polluter makes decisions based only on the direct cost of and profit opportunity from production and does not consider the indirect costs to those harmed by the pollution. The indirect costs include decreased quality of life, say in the case of a home owner near a smokestack; higher health care costs; and forgone production opportunities, for example, when pollution harms activities such as tourism.
- Since the indirect costs are not borne by the producer, and therefore not passed on to the end user of the goods produced by the polluter, the social or total costs of production are larger than the private costs.
- There are also positive externalities, and here the issue is the difference between private and social gains. For example, research and development (R&D) activities are widely considered to have positive effects beyond those enjoyed by the producer that funded the R&D—normally, the company that pays for the research.
- This is because R&D adds to the general body of knowledge, which contributes to other discoveries and developments. However, the private returns of a firm selling products based on its own R&D typically do not include the returns of others who benefited indirectly. With positive externalities, private returns are smaller than social returns.

Q Source: Page 30: 12th Macroeconomics NCERT