

PART – II
(SECTION – A)

- Q. 2. (a)** Differentiate between a star and a planet. What is the magnitude of a star and how the color of stars is correlated with their temperatures? (5)
- (b)** “Semiconductors are the Brains of Modern Electronics”. Explain in detail what this quotation means. (5)
- (c)** Briefly describe the most popular and accepted theory about the origin of the Universe. (5)
- (d)** What are the advantages and limitations of renewable energy resources? Briefly explain the prospects of non-conventional energy resources in Pakistan. (5)(20)

Q (A) Differentiate between a star and a planet. What is the magnitude of a star, and how the colour of stars correlated with their temperatures?

Star

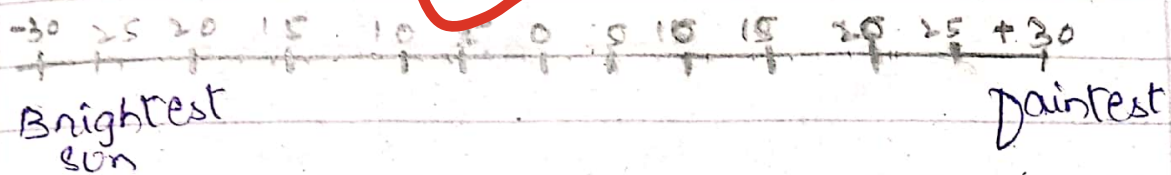
Planet

- | | |
|---|------------------------------------|
| ⇒ Star is a luminous body. | ⇒ Planet is a non-luminous body. |
| ⇒ Planets revolve around star i.e. sun. | ⇒ Moons orbit around planet. |
| ⇒ Life do not exist on star. | ⇒ Life exists on planet Earth. |
| ⇒ Star is a sphere of hot gases. | ⇒ A heavy body in space is planet. |

Magnitude of a star:

Magnitude of a star means the brightness of a star. The brightness can be measured through a stellar magnitude scale. In this scale, the most brightest

Star ~~is~~ has lowest value while most faintest star has highest value.



Relation between colour and temperature of a star:

The surface colour of a star tells about its temperature. The colour is determined by wavelength which is determined by magnitude. Thus, according to Planck's equation

$$E \propto \frac{1}{\lambda}$$

In this relation, energy is inversely proportional to wavelength.

Therefore, the blue stars have lowest wavelength and hence, highest energy and temperature, that is why it is very hot. Whereas, the

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red star has high wavelength and low energy and low temperature as well.

B) Semiconductors are brains of modern computer electronics. Explain in detail what this quotation means:

Semiconductors: The semiconductors are the type of materials which are partially conducting electricity. There are P-type and N-type semiconductors as well.

Semiconductors as main modern electronics:

- Computers: Semiconductors are used in computers as microchips. The microchips performs important functions like ~~time~~ launching programs and other such things.
- Banks: The modern day banking requires modern day solutions which is provided in form

of microchips through semiconductors. This helps in conducting accounting transactions digitally.

• Household appliances: The household appliances like refrigerators, washing machines and other appliances uses semiconductors to operate efficiently. The timer, temperature control and other automated features are all managed by semiconductors.

Q) Briefly describe the most popular and accepted theory about origin of universe.

The origin of universe is the question that clicked in the minds of many scientists so far. But the most widely accepted theory is "Big Bang Theory". This theory explains how the universe was created from a small hole and expanded to become ~~the most~~ a giant one.

Big Bang Theory; A brief overview:

Big Bang theory explains that world originated from a small hole called singularity. The entire universe was inside this a very hot bubble which was thousands times small. Then it suddenly got exploded. After it got exploded, it began to expand. As the universe expanded it cooled it down and matters and antimatters were made. Then, these star two opposite particles destroyed each other. The more stable particles sustained which were given the name of proton and neutrons. These particles formed hydrogen and helium nuclei. The universe got filled with clouds of helium and hydrogen gas. These clouds later formed all the celestial bodies.

Evidence of Big Bang theory

① wavelength: Light from the distant galaxies are red shift and tells that galaxies are moving away from the Earth just like Big Bang theory suggested.

② Hubble's constant: Hubble told that galaxies are outside our Milky way and moving far away. So, this shows that galaxies originated from a single point.

③ What are the advantages and limitations of renewable energy resources? Briefly explain the prospects of non-conventional energy resources in Pakistan.

Renewable energy resources means that these can be used again and over replenished again. Recently, renewable energy has gained immense importance because of expensive fossil fuel, scarce energy resources (the non-renewable ones) and such other reasons.

Advantages of renewable energy:

Sustainable source of energy:

Renewable energy has this quality that it can be reused or replenished again which makes it useful in the long run. Renewable energy is like a one time investment which reaps benefits for at least 20-30 years.

Operational cost effectiveness:

The renewable energy is a one time investment which will then not require heavy amounts for its operation. For instance, the solar panels once installed in a home or office will be free of utilities bills every month.

Environment friendly: Renewable energy do not produce smoke, debris and other wastes that may harm environment like fossil fuels. The proper handling

renewable energy resources will provide the intended benefit.

Limitations:

High Initial Investment: The initial investment for renewable energy is high which makes it quite unappealing for developing countries.

Efficiency depends on geography: The renewable energy resource requires the natural conditions for its operation. Like, for solar to work it should be located at such a place where sunlight falls frequently, suitable for countries like Pakistan but not for Canada.

Improper dumping may cause unwanted outcomes:
Renewal The disposal or dumping of renewable energy, after its life is finished, is a big

challenge of the renewable energy system is that it is not properly disposed. This may cause accumulation of toxic substances.

Prospects of non conventional energy resources in Pakistan:

Wind: Pakistan has an ideal weather in terms of wind being installed used as a source of energy. Since the country has well known wind corridors and an average wind speed of 7.87 m/s in 10% of its windiest areas, the country has a good potential of using wind as an energy source.

Solar Energy: Pakistan is located in a region where summers are experienced most by the people which means sunlight is highly prevailing most of the time. According to

World Bank, the country can ~~just~~ meet its current demand by just utilizing 0.071% of country's area on solar energy.

Biomass: Pakistan has great amount of wastage which can be directed at the right place. Rather than burning the waste and contributing further to environmental damage, Pakistan should use the waste for electricity generation.