POE Important Questions

Q. Explain about steam pyramid educational model structure applied in teaching and learning.

Ans. The STEAM Pyramid Educational Model is an educational framework that integrates Science, Technology, Engineering, Art and Mathematics into a holistic approach to teaching and learning.

The model's structure is designed to enhance creativity and innovation while reinforcing the technical skills traditional emphasized in STEM education.

Application of STEAM in teaching and learning :-

1. Integrating Art with STEM:-

- STEAM differs from STEM by adding Art, which encompasses creative ~~disciplines~~ disciplines such as visual arts, music, design and performing arts.

- This type of model encourages students to apply creativity in technical fields, which leads to innovative thinking and broader problem-solving capabilities.

2. Pyramid Structure of Learning Levels:

- STEAM Pyramid visually represents the interconnections of different subjects in STEAM education.

- Each level shows students how to integrate scientific, mathematical and creative approaches across different fields.

- At the ~~base~~ base of the pyramid, we have core subjects like biology, chemistry, physics and mathematics. ~~At apex~~ At apex of pyramid, art is incorporated, showing creative support to scientific & technological subjects.

3. Hands-on and Experiential Learning :-

- STEAM approch emphasizes on experimental learning, where students engage in hands-on projects, simulations and experiments that bridge the gap between theory and practice.
- It encourages active engagement & participation rather than passive learning
- Models are built by applying engineering principles, apply mathematics to calculate energy efficiency, use technology to simulate real-world conditions and incorporate artistic element to make their designs visually appealing.

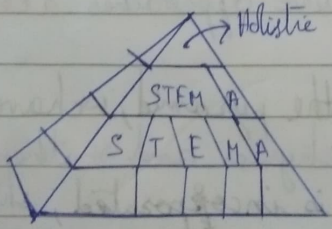
4. Creativity & Innovation in Problem Solving :-

- The creative aspect of the STEAM model encourages students to think beyond conventional solutions, fostering innovations.
- Apply artistic techniques such as design thinking, visualization and aesthetics in fields like engineering and technology.

5. Encouraging Lifelong Learning and Adaptibility :-

- STEAM education ~~encourages~~ fosters an attitude of lifelong learning, as students are encouraged to continuously explore new knowledge and integrate various disciplines.
- It helps students adapt to changes in technology and society, as they develop both technical and creative skills.

Pyramid :-



Q2. Discuss about the various attributes required for engineer.

Ans. The various attributes required for engineers include:-

1. Teamwork :- Effective collaboration in group settings

Teamwork ensures that engineers can contribute their expertise, communicate and collaborate with others and integrate their efforts into larger projects.

2. Creativity :- Bringing innovative solutions to the table.

Engineers must be able to think outside the box and come up with innovative solutions to the problems.

3. Problem solving & Logical Thinking :- Break down systems and understanding their operations through analysing the challenges faced when approaching the problem.

Engineers must understand the root cause of the problem and break down a complex problems into smaller, yet managable tasks.

4. Mathematical Ability :- Using math to design and interpret systems

Strong mathematical skills are essential for engineers. They must understand how to apply mathematics to interpret data, perform simulations and ensure the model is working correctly.

5. Leadership :- Guilding teams and inspiring effective collaboration

Leadership skills are important for engineers, especially for those who take on management roles.

A successful engineer must be able to motivate and inspire others to ensure that the team works towards a common goal.

Q3. Explain about product life cycle and its stages.

Ans. The Product Life Cycle (PLC) describes the stages a product goes through from its inception (beginning) to its decline (end) in market.

It highlights how the product evolves in terms of market acceptance, sales growth and competitive challenges.

Stages of PLC are:-

1. Product Development :- Also known as pre-market phase where the product is introduced, designed and developed.

This is when all the research and development happens.

2. Product Growth :- Its the stage where the product is ~~succes~~ successfully manufactured and launched into the market

The sales start to accelerate as customer awareness increases.

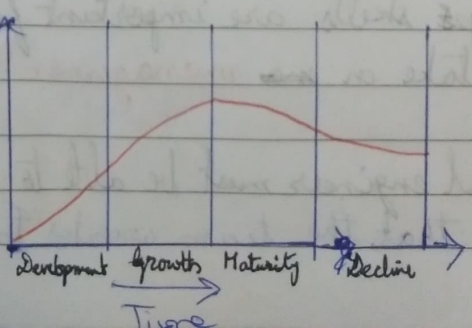
3. Product Maturity :- Its the stage where the product has reached its peak in terms of sales and market penetration.

The sales continue but at slower rate. This is due to increased ~~mar~~ market competitors.

4. Product Decline :- Its the stage where the product looses its ~~pro~~ market ~~relevance~~ relevance.

The sales decrease sharply and product's demand decreases.

Graph :-



Q4. Demonstrate the relation between arts, mathematics, science and technology

Ans. Relation between arts, mathematics, science and technology are :

1. Art & Mathematics :- • Maths helps artist create balanced & beautiful works
   • Concepts like proportions & geometries are important in painting and arts architecture.

2. Art & Science :- • Art can visualize scientific ideas that are hard to explain with words
   • Both fields make use of imagination and creativity

3. Art & Technology :- • Technology uses artistic designs to explain model
   • Encourages creativity in problem solving

4. Mathematics & Science :- • Mathematics is the language of science which helps in data analysis and theory testing.
   • Scientific formulas & equations are based on mathematical formulas.

5. Science & Technology :- • Technology applies scientific knowledge to create new sol^n
   • Advances in technology enable better scientific research and discoveries.

6. Mathematics & Technology :- • Technology relies on maths for design and problem solving
   • Fields like engineering and computer science use math to create safe & efficient systems.

Qs. Explain about ABET

Ans. ABET stands for Accreditation Board for Engineering and Technology.

It is a non-profit organisation responsible for accrediting (give credit to) post-secondary education systems/programs in applied and natural science, computing, engineering etc.

1) Purpose of ABET:-

- Ensures that educational programs meet quality standards, which help graduates prepare for professional practice.
- It focuses more on outcomes, rather than just course content

2) Accreditation Criteria:-

- In 1996, ABET introduced Engineering Criteria 2000 (EC2000), which emphasizes learning outcomes.
- Programs must demonstrate that students achieve specific skills and knowledge by graduation.

3) Learning Outcomes:-

- An ability to apply knowledge of science, mathematics and engineering
- An ability to design and conduct experiments, as well as analyse & interpret data
- An ability to identify, formulate and solve complex problems.
- An ability to communicate effectively
- Broad understanding of impact of engineering solutions in global and social context.

Q6. Explain about ontology.

Ans. Ontology is a branch of philosophy that studies concepts such as existence, being, becoming and reality.

It examines what entities exist and how they are grouped & categorised on a fundamental level.

Ontology is referred to as "science of being" which is part of a even larger philosophical field known as metaphysics.

Two main types of Ontology:-

1) Reference Ontology (RO):-

- Focusses on theory crafting & representation
- Aims to provide accurate and comprehensive description of reality
- They emphasizes metaphysical realism, and truth.
- They use full first-order logic & emphasize representing the world as it is.

2) Application Ontology (AO):-

- Designed for specific computational applications
- They are more pragmatic in nature / emphasize on practical use.
- Aim to represent concepts rather than striving for an objective reality
- They focus on conceptualizing a domain, rather than on strict adherence to metaphysical realism.