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ESE-2022 (PRELIMINARY EXAMINATION)

QUESTIONS WITH DETAILED SOLUTIONS

GENERAL STUDIES & ENGINEERING APTITUDE

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ESE - 2022

General Studies & Engg. Aptitude

Questions with Detailed Solutions

SET - A
20/02/22

SUBJECTWISE WEIGHTAGE

S. No.	NAME OF THE SUBJECT	Number of Questions
01	Current Issues & Background Concepts of Social Economic and industrial development	18
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Total No. of Questions		100

01. Which of the following are the elements of TQM?

1. Teamwork and Employee empowerment
2. Feedback mechanisms
3. Strong division of labour
4. Result oriented management

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 3 and 4 only
 (c) 2, 3 and 4 only (d) 1, 2, 3 and 4

01. Ans: (a)

Sol:

It is never a result oriented rather than it is process oriented.

There are 8 Elements of TQM

- Customer - Driver Quality
- Top Management Commitment
- Continuous Improvement
- Employees participation and development
- Treating supplier as partner
- Fast response
- Management by Facts
- Design quality and prevention

02. The quality characteristics can be categorized in which of the following groupings?

1. Sensory characteristics
2. Structural characteristics
3. Statistical characteristics
4. Tie oriented characteristics

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 4 (b) 1 and 4 only
 (c) 2 and 3 only (d) 1, 2 and 4 only

02. Ans: (d)

Sol:

Quality characteristics, can be categorized in these groupings: Structural Characteristics include such elements as the length of a part, the weight of a can, the strength of a beam, the viscosity of a fluid, and so on; sensory characteristics include the taste of good food, the smell of a sweet fragrance, and

the beauty of a model, among other; time-oriented characteristics include such measures as time to process a purchase order, warranty, reliability, and maintainability associated with a product; and ethical characteristics include honesty, courtesy, friendliness, and so on.

Note: Statistical characteristics is not a part of quality characteristics rather than it is a process control technique

Quality Characteristics

Structural – Length, frequency, viscosity

Attribute – Good or Bad, Accept or Reject

Time Oriented – Reliability, maintainability

Ethical – Courtesy, honesty

Commercial – Warranty

Sensory – Taste, beauty

03. What are the major categories for quality costs?

1. Prevention costs
2. Appraisal costs
3. Production costs
4. Internal failure costs

Select the correct answer using the code given below:

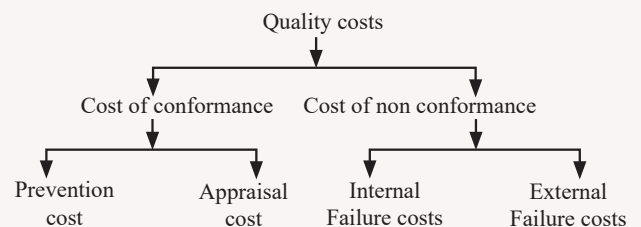
- (a) 1, 2 and 3 only (b) 1, 2 and 4 only
 (c) 3 and 4 only (d) 1, 2, 3 and 4

03. Ans: (b)

Sol:

Cost of quality (COQ) is defined as a methodology that allows an organization to determine the extent to which its resources are used for activities that prevent poor quality.

Having such information allows an organization to determine the potential savings to be gained by implementing process improvements.



04. Consider the following statements regarding evaluating sampling plans:

1. If rectifying inspection is conducted for lots rejected by the sampling plan is the average total inspection.
2. The average number of items inspected for a series of lots in order to make a decision is the average sample number.
3. The average quality level of a series of batches that leave the inspection station after coming in for inspection at a certain quality level is the average outgoing quality limit.

Which of the above statements are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

04. Ans: (a)

Sol:

The average number of items inspected for a series of lots with a given incoming lot quality in order to make a decision is known as the average sample number (ASN).

If rectifying inspection is conducted for lots rejected by the sampling plan, another evaluation measure is the average total inspection (ATI). The ATI represents the average number of items inspected per lot. If a lot has no nonconforming items, it will obviously be accepted by the chosen sampling plan, and only n items (the sample size) will be inspected for a lot

The average outgoing quality limit (AOQL) is the maximum value, or peak, of the AOQ curve. It represents the worst average quality that would leave the inspection station, assuming rectification, regardless of the incoming lot quality.

05. Consider the following statements with reference to principal quality objectives:

1. The organization should achieve and sustain the quantity of the product so as to continually meet the purchaser's stated or implied needs.
2. The organization should provide confidence to its own management that the intended quality is being achieved and sustained.

3. The organization should provide confidence to the purchaser that the intended quality is being, or will be achieved in the delivered product.

Which of the above statements are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

05. Ans: (d)

06. Trial runs are recommended for which of the following reasons?

1. Trial runs provide an opportunity to remedy the situation during the experiment.
2. Trial runs provide a final chance to fine-tune levels of a factor
3. Trial runs provide a chance to make any needed changes in the experimental plan during the experiment.
4. Trial runs can help considerably in estimating the time to complete a run, the logistical support required for level changes, and total time needed to complete an experiment.

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 4 (b) 1 and 3 only
(c) 2 and 4 only (d) 2, 3 and 4 only

06. Ans: (a)

Sol:

- Opportunity to formerly the siltation
- Fine time levels of a factor
- Needed changes in experimental plan
- Estimating level changes time needed to complete time needed to complete an experiment

07. Which one of the following is NOT a source of variation present in every process of construction?

- (a) The equipment (b) The material
(c) The environment (d) The specifications

07. Ans: (d)



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08. The international dispute about modern environmental movement began with the publication of Silent Spring by

- (a) Mary Daly (b) Rachel Carson
(c) Carolyn Merchant (d) Maria Mies

08. Ans: (b)

Sol:

The international dispute about modern environmental movement began with the publication of silent spring by

Rahel Carson: About Rachel Carson Rachel Carson was a pioneer in the field of marine biology. Growing up in Pittsburgh, she was stranger to the air pollution caused by big plants & factories. As she got older, she began to write articles and Journals about how this pollution affected ocean life, & how little regulation the output of these chemicals had.

About her work in 1962 Rachel Carson published "Silent Spring", a "Landmark literary piece of the 20th century" that focused on the environmental Impact of the use of pesticides, such as DDT.

Unfortunately, Carson & her work were net with did not want to see their steady. Haw of profit cut off by the banning of pesticides & Carson's leers mainly male biologists, criticized her credentials simply because she was a women. Silent Spring made its mark on this world by paving a way for new lows, new communities, new agencies, & most importantly, it helped prompt the modern environmental, movement direct from our lectern & also from our test series.

09. Which one of the following is NOT a principle of CERES?

- (a) Controlled production
(b) Energy conservation
(c) Informing the public
(d) Protection of the biosphere

09. Ans: (a)

Sol:

CERES state its 10 principles are as follows.

1. Protection of the biosphere.
 2. Sustainable use of natural resources
 3. Reduction & disposal of wastes
 4. Energy conservation
 5. Risk reduction
 6. Safe products & services
 7. Environmental restoration
 8. Informing the public
 9. Management commitment
 10. Audits & reports.
10. The largest tidal range in the world is
- (a) Bay of Fundy
(b) Ungava Bay
(c) Bristol Channel
(d) Turnagain Arm of Cook Inlet

10. Ans: (a)

Sol:

The world's largest tidal range is observed at Canada. Bay of Fundy. Which can reach 16.3 m [53 feet]. The Bay of Fundy is the best example of how geography can Increase a tidal range by funneling.

11. Kyoto Protocol operationalizes the UN framework convention on

- (a) sustainable development
(b) renewable energy
(c) climate change
(d) soil erosion

11. Ans: (c)

Sol:

Kyotoprotocol is implementing under united Nation Framework Convention on climate change (UNFCCC). The main objective of kyotoprotocol is to control climate change & global warming.

12. According to Carson, which one of the following approaches argues that nature has intrinsic value and we should protect it because of this value?

- (a) Instrumental approach
- (b) Axiological approach
- (c) Eco-critical approach
- (d) Anthropological approach

12. Ans: (a)

Sol: Intrinsic value is the value that an entity has in itself, for what it is, or as an end and instrumental approaches, argues that nature has intrinsic value and we should protect it because of this value.

13. The Gaia hypothesis, which suggested that the earth should be seen as a single organism, was devised by

- (a) James Lovelock
- (b) Françoise d'Aubonne
- (c) Earnest Haeckel
- (d) Paul Ehrlich

13. Ans: (a)

Sol:

This refers to a scientific hypothesis which states that the earth is a complex living entity with the sustenance of life dependent on self-regulating interactions among organisms and their inorganic surroundings.

This Gaia hypothesis is named after the mythical Greek goddess Gaia who personifies the earth. It was first proposed by the British scientist James Lovelock in his paper 1972.

14. Energy used by man does NOT originate from which one of the following sources?

- (a) Radiant energy
- (b) Geothermal power
- (c) Frictional energy
- (d) Gravitational energy

14. Ans: (c)

Sol: There are 5 fundamental sources of energy:

- 1. Nuclear fusion in the Sun (solar energy)
- 2. Gravity generated by the Earth & Moon.
- 3. Nuclear fission reactions.
- 4. Energy in the interior of the Earth.
- 5. Energy stored in chemical bonds.

15. The term "Sacred" is often used to denote a project that

- (a) a powerful, high-ranking official is advocating
- (b) facts are advocating
- (c) sound reasoning is advocating
- (d) less weaknesses are advocating

15. Ans: (a)

Sol:

- Protected interest
- Thing/person above criticism
- God/Goddess.
- Powerful, high ranking official is advocating.

16. Which one of the following is NOT a condition for preferring Top-Down Time and Cost Estimates?

- (a) Strategic decision making
- (b) Cost and time important
- (c) High uncertainty
- (d) Internal, small project

16. Ans: (b)

Sol:

- The top-down approach is well suited for strategic decision making during initial stage of the project.
- Top-down estimates are used initially until the tasks in work-break-down structure (WBS) are defined clearly (well defined schedule).

Bottom-up approach is more reliable and practical compared to top-down approach. When cost and time both are important then we use bottom-up approach.



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17. In Network Computation Process, which one of the following is correct for forward pass?
- It start with the first project activity(ies) and traces each path (chain of sequential activities) through the network to the last project activity(ies)
 - This is the longest path in the network, which will delay the project
 - It starts with the last project activity(ies) on the network
 - It starts with the last project activity(ies) and traces each path (chain of sequential activities) through the network to the first project activity(ies)

17. Ans: (a)

Sol:

Forward Pass Technique

It starts with the first activity and first event and traces each path. It ends at last activity and last event in a protect networks.

18. Consider the following statements regarding production :
- The major aspects of production that may lead to sickness are
- increase in the cost of production.
 - decrease in the quantity of production
 - quality of product not meeting the standards/customer expectation.
 - Producing more quantity than can be sold, leading to accumulation of stock.
- Which of the above statements are correct?
- 1 and 2 only
 - 1, 2, 3 and 4
 - 2 and 3 only
 - 1, 3 and 4 only

18. Ans: (b)

Sol:

- Lack of demand leads to overstock.
- Increase in the cost of production (high prices of inputs)
- Quality of product not meeting the standards/customer expectation.
- Less Production.

19. Which one of the following projects are those which are to be completed within a stipulated time, even at the cost of ending up with a higher project cost?
- Normal projects
 - Business projects
 - Crash projects
 - Research projects

19. Ans: (c)

Sol:

Crash Projects: The project is to be completed within a stipulated the specified by a client/customer. As a result, this is an increase in total project cost.

20. Which one of the following policies is concerned with changing the supply of money stock and the rate of interest, for the purpose of stabilizing the economy at full potential output level?
- Commercial policy
 - Fiscal policy
 - Monetary policy
 - Social policy

20. Ans: (c)

Sol: Monetary policy is the control of the quantity of money available in an economy and the channels by which new money is supplied. By managing the money supply, a central bank aims to influence macroeconomic factors including inflation, the rate of consumption, economic growth, and overall liquidity.

21. Which one of the following is NOT a classification of microscopic diffusion?
- Inter-diffusion
 - Vacancy diffusion
 - Surface diffusion
 - Lattice diffusion

21. Ans:(c) & (d)

Sol: Surface diffusion: It refers to the motion of atoms, sometimes molecules, over the surface of some substrates

When the surface motion of atoms extends over long distances and many types of site are encountered and hence it is a macroscopic diffusion
 lattice diffusion is also known as bulk diffusion in which large no. of atoms or molicules diffuse in a large distance

22. Many bulk polymers that are crystallized from a melt, are semi crystalline and form which one of the following structures?

- (a) Spherolite structure
- (b) Spherelite structure
- (c) Spherulite structure
- (d) Spherilite structure

22. Ans: (c)

Sol: Spherulite structure: Spherulites are spherical semi-crystalline regions inside non-branched linear polymers. Spherulite structure polymers composed of highly ordered lamellae, which result in higher density, harder but also brittleness when compared to disordered regions in polymer

23. 'Positive and negative ions by virtue of their net electrical charge, attract one another', these attractive bonding forces are

- (a) Coulombic
- (b) Magnetic
- (c) Electromagnetic
- (d) Non-magnetic

23. Ans: (a)

Sol: Coloumbic force: An electrostatic force of attraction between two opposing charges

$$\text{coulombic force} = F \propto \frac{q_1 q_2}{r^2}$$

q_1 = Positive charge

q_2 = negative charge

r = Distance between two charges

24. The process by which plastic deformation is produced by dislocation motion is termed as

- (a) Plane slit
- (b) Seepage
- (c) Slip
- (d) Twinning

24. Ans: (c)

Sol: Slip is a dislocation motion in an easy manner that require low energy for the plastic deformation

25. Stereoisomerism denotes the situation in which atoms are linked together

- (a) in the different order and also differ in their spatial arrangement
- (b) in the different order but same in their spatial arrangement
- (c) in the same order (head-to-tail) but differ in their spatial arrangement
- (d) in the same order (head-to-tail) and also same in their spatial arrangement

25. Ans: (c)

Sol: Stereoisomer's are isomers that have the same composition but that differ in the orientation of those parts in space

26. Some of the complex thermoplastic chains become so stiff that they act as rigid rods, even when heated above the melting point. These materials are

- (a) Solid crystalline polymers
- (b) Semi solid crystalline polymers
- (c) Liquid crystalline polymers
- (c) Copolymers

26. Ans: (c)

Sol: Liquid crystalline polymers: LCP are special type of complex thermoplastics exhibits properties between highly ordered solid crystalline and amorphous disordered materials.

27. Which one of the following are the well-known routing attacks on IoT?

- (a) Clone Id and Sybil attacks
- (b) Selective-reversing attacks
- (c) Packet reversing attacks
- (d) Frame selective wired attacks

27. Ans: (a)

Sol: The following are the well known routing attacks in IoT

- (a) Sinkhole Attack
- (b) Sybil attack – It is one of the dangerous attacks in which attacker misleads other nodes by distributing duplicate identity to degrade the routing performance. Sybil node use fake MAC address selected randomly as their identity for acting as a different device which aims to destroy the network resources. Because of the Sybil attack, the legitimate nodes are denied access to reserved resources. The malicious nodes called Sybil nodes are responsible for sybil attack in the wireless network.
- (c) Hello Flooding attack
- (d) Clone ID attack - In this attack, the attacker node copies the identification information of a valid physical node. This helps the attacker to get access to a highly dignitary part of the network
- (e) Local repair attack
- (f) Wormhole attack
- (g) Blackhole attack
- (h) Neighbor attack
- (i) Rank attack
- (j) Selective Forwarding attack

28. Which one of the following layers in the OSI reference model is concerned with transmission of unstructured bit stream over physical medium; deals with the mechanical, electrical, functional, and procedural characteristics to access the physical medium?

- (a) Transport layer (b) Network layer
- (c) Data link layer (d) Physical layer

28. Ans: (d)

Sol: The physical layer is the lowest layer of the OSI model. This layer controls the way unstructured, raw, bit -stream data is sent and received over a physical medium. This layer is composed of the electrical, optical, and physical components of the network. The physical layer carries the signals for all of the higher layers.

29. Which one of the following systems is used when there are rigid time requirements on the operation of a processor or the flow of data, and thus is often used as a control device in a dedicated application?

- (a) A real-time system
- (b) A distributed system
- (c) A parallel system
- (d) A serial system

29. Ans: (a)

Sol:

A real-time operating system (RTOS) is an operating system for real-time applications that processes data and events that have critically defined time constraints. The following are the types of RTOS. They are

(i) Hard Real time systems:

These operating systems guarantee that critical tasks be completed within a range of time.

(ii) Soft real time systems

This operating system provides some relaxation in the time limit.

30. Which one of the following servers is a tool that allows an information provider to prepare indexes of unstructured documents, and allows user to search these indexes with natural language questions?

- (a) Name server
- (b) Terminal server
- (c) Wide area information server
- (d) File server

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30. Ans: (c)

Sol:

Wide Area Information Server (WAIS) is a client-server text searching system that uses the ANSI Standard Z39.50 Information Retrieval Service Definition and Protocol Specifications for Library Applications” (Z39.50:1988) to search index databases on remote computers.

31. Which one of the following protocols is designed to provide privacy between two communicating applications viz a client and a server?

- (a) Data link layer protocol
- (b) Physical layer protocol
- (c) Secure socket layer protocol
- (d) Session layer protocol

31. Ans: (c)

Sol:

SSL provide security to the data that is transferred between web browser and server. SSL encrypt the link between a web server and a browser which ensures that all data passed between them remain private and free from attack.

SSL provides privacy and data integrity between two communicating applications. It is designed to encapsulate other protocols, such as HTTP. TLS v1.0 was released in 1999, providing slight modifications to SSL 3.0.

A website that implements SSL/TLS has “HTTPS” in its URL instead of “HTTP.”

32. Which one of the following is an advantage of branched or Intrinsic programming type or style in ICT based teaching and learning process?

- (a) Large frames reduce the time of learning
- (b) There is a possibility of guesswork
- (c) It is very expensive to provide so many audio-visual aids
- (d) Revise/redesign at frequent intervals is difficult and expensive

32. Ans: (a)

Sol:

Limitations of Branching Programming

1. The learner may guess the correct response without understanding the subject matter of the frame.
 2. Infinite branching cannot be provided. It cannot cater to the needs of the individuals. It is very difficult to find out the total number of branches for each individual.
 3. Cost of preparation is high, audio-visual equipment is costly.
 4. The programme needs revision after every two years which is very costly affair.
 5. Programmes are the product of programmer’s imagination and it is he who decides diagnostic questions and level of content.
 6. Branching model can be used after sixth grade and grade because small children do not follow its mechanism.
 7. It is very difficult to ask questions on the whole matter of the frames because the frames are too large and sometimes important subject matter is left.
 8. It does not consider learning process whether learning is taking place or not. Main emphasis is on diagnosing the weakness of learners and providing remedy to them.
 9. There is no sequencing of pages. Student finds it difficult to follow the steps. He does not find it exciting or motivating, therefore he does not want to go through these pages.
 10. More emphasis on remediation rather than teaching. Hence, it is only a tutorial approach.
33. Which one of the following learnings is a teaching approach that engage students in sustained, collaborative real-world investigations?
- (a) Project-based learning
 - (b) Cooperative learning
 - (c) Collaborative learning
 - (d) Outcome based learning

33. Ans: (a)

Sol:

In **Project Based Learning**, teachers make learning come alive for students. Students work on a project over an extended period of time – from a week up to a semester – that engages them in solving a real-world problem or answering a complex question.

Cooperative learning is a teaching method where students of mixed levels of ability are arranged into groups and rewarded according to the group's success, rather than the success of an individual member.

Cooperative learning is sometimes thought of simply as 'group work,' but groups of students working together might not be working collaboratively.

Collaborative learning as learning that involves students working together toward a common goal, including group learning, team learning, etc.

34. Which one of the following schemes is used for radio stations within the same region, where each radio station has its own frequency?
- Space division multiplexing
 - Frequency division multiplexing
 - Time division multiplexing
 - Code division multiplexing

34. Ans: (b)

Sol:

SDM is used in optical communication

FDM is used in radio and TV broadcasting

CDM is used in mobile communication

35. The AES key expansion algorithm takes as input a 4-word (16-byte) key and produces a linear array of
- 50 words (200 bytes)
 - 44 words (176 bytes)
 - 40 words (160 bytes)
 - 35 words (140 bytes)

35. Ans: (b)

Sol:

The AES key expansion algorithm takes as input a 4-word (16-byte) key and produces a linear array of 44 words (176 bytes).

36. Consider the following statements regarding engineers as responsible experimenters:
- It includes a conscientious commitment to live by moral values.
 - It can be accountable for the results of the project.
 - It restricts free-personal involvement in all steps of the project or product development
 - It includes constant awareness of the progress of the experiment and readiness to monitor the side effect, if any.
- Which of the above statements are correct?
- 1 and 2 only
 - 3 and 4 only
 - 1, 2 and 4 only
 - 1, 2, 3 and 4

36. Ans: (c)

Sol:

37. Which one of the following is NOT included in Nussbaum's basic human functional capabilities?
- Being able to live a human life of normal length
 - Being able to use senses, imagine, think, and reason
 - Being able to laugh, play, and enjoy recreational activities
 - Being able to earn livelihood and live peacefully

37. Ans: (d)

Sol:

Martha Nussbaum identified an Aristotelian set of ten universal, normative capabilities that act as freedoms that are generally protected by law. These may be viewed as needs, although they are also related to values.

- Life: Being able to live a complete and satisfying life into old age. Not having life cut short or being made such that it hardly seems worth living.

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2. **Bodily Health:** Living with good health, and not in a state where ill health seriously affects the quality of life. Having access to medical help as needed. To have good food and be able to exercise in ways that sustain health.
3. **Bodily Integrity:** Being able to go where you want to go. Being free from attack and abuse of any kind. Being able to satisfy healthy bodily needs.
4. **Senses, Imagination and Thought:** Being able to use all of one's senses. Being free to imagine, think and reason. Having the education that enables this to be done in a civilized, human way. Having access to cultural experiences, literature, art and so on and being able to produce one's own expressive work. Having freedom of expression, including political and religious.
5. **Emotion:** Being able to become attached to other things and people outside of ourselves, loving and caring for them. Experiencing grief, longing, gratitude and justified anger. Not being subject to fear and anxiety or blighted by trauma or neglect.
6. **Practical Reason:** Being able to consider and develop understanding of good and evil, and to think critically about the world and one's own place in it. Being able to live with one's conscience.
7. **Affiliation:** Being able to associate with others, living with them and acting for them. Showing concern for people in general and interacting with others. Having sympathy and compassion, acting to help people. Seeking justice and making things right. Protecting others and the rights of people, including freedom of speech and freedom from fear.
8. **Other Species:** Being able to live with the full range of creatures and plants that inhabit the world around us. To be able to enjoy nature and appreciate its beauty.
9. **Play:** Being able to laugh, play games and generally have fun. Not having one's enjoyment and recreation criticized or prevented.
10. **Control Over One's Environment:** Being able to participate in political activities, making free

choice and joining with others to promote political views. Being able to own property and goods on the same basis that others do so. Being able to seek and accept work, and to be treated reasonably at work. Being free from unwarranted search and seizure.

38. Which one of the following is NOT a type of virtue for responsible professionalism
 - (a) Public-spirited virtue
 - (b) Teamwork virtue
 - (c) Self-realization virtue
 - (d) Self-direction virtue

38. Ans: (c)

Sol:

1. **Public-spirited virtues:** Maintaining a sense of community with faith and hope within the society and being generous by extending time, talent and money to professional societies and communities, an engineer can maintain the public-spirited virtue.
2. **Self-direction:** Fundamental and necessary in exercising moral responsibility. virtues are concerned with moral responsibilities which represent integrity and self-respect of the person. The integrity actually means the moral integrity which refers to the actions, attitude and emotions of the person concerned during his professional period.
3. **The self-governance virtues** center on commitment, courage, self-discipline, perseverance, self-respect and integrity. The truthfulness and trustworthiness which represent his honesty are the crucial moral values to be kept up by a professional.
4. **Teamwork:** Collegiality, cooperativeness, communicative ability, and respect for legitimate authority
5. **Proficiency virtues:** These refer to the virtues followed in the profession according to the talent and intellect of an engineer. The moral values that include this virtue are competence and diligence. The competence is being successful in the job being done and the diligence is taking care and having alertness to dangers in the job

6. Cardinal virtues: These virtues represent the coordination among team members which means working successfully with other professionals. These include cooperative nature along with loyalty and respect towards their organization, which makes the engineers motivate the team professionals to work towards their valuable goals. What is Self Realization Virtue?

The school of ethical thought which Aristotle propounded is termed “Self Realizationism, implying that the goal of the ethical life is the actualization or the fulfillment of one’s potentialities, one’s true nature, or one’s gifted talents.

39. Which one of the following is NOT Davis’ eight moral tests?

- (a) Harm test (b) Acceptability test
(c) Virtue test (d) Professional test

39. Ans: (c)

Sol:

Seven-step guide to ethical decision-making

1. Harm test: Does this option do less harm than the alternatives?
2. Publicity test: Would I want my choice of this option published in the newspaper?
3. Defensibility test: Could I defend my choice of option before the associate teacher/child/principal/parents/my peers/my family?
4. Reversibility test: Would I still think my choice of this option is good if I were adversely affected by it?
5. Colleague test: What do my colleagues say when I describe my problem and suggest this option is my solution?
6. Professional test: What might the professional bodies Council say about this option?
7. Organization test: What does the Organization’s policy say about this?

Make a choice based on steps 1-5.

40. Arrange the following in hierarchical order as suggested by Carroll in the four-part model of corporate social responsibility?

1. Economic
2. Philanthropic
3. Legal
4. Ethical

Select the correct answer using the code given below:

- (a) 2, 4, 3, 1 (b) 4, 3, 1, 2
(c) 2, 1, 3, 4 (d) 1, 3, 4, 2

40. Ans: (d)

Sol:

Corporate social responsibility encompasses the economic, legal, ethical, and discretionary (philanthropic) expectations that society has of organizations at a given point in time” (Carroll 1979, 1991). This set of four responsibilities creates a foundation or infrastructure that helps to delineate in some detail and to frame or characterize the nature of businesses’ responsibilities to the society of which it is a part

41. The Engineers for a Sustainable World (ESW) meant for using the professional talents to create a more sustainable world was founded in

- (a) 1999 (b) 2000
(c) 2001 (d) 2002

41. Ans: (c)

Sol:

Engineers for a Sustainable World (ESW) is a not-for-profit network headquartered in Pittsburgh, PA, USA. ESW is an umbrella organization with chapters established at over 50 colleges, universities, and city chapters located primarily in the United States and Canada. ESW members work on technical design projects that have a focus on sustainability and environmental issues. Projects can be located either on-campus, in the local community, or internationally. Chapters are made up of students or professionals and are semi-autonomous.

ESW was known as Engineers Without Frontiers

USA (EWF-USA) through 2004. ESW was established in 2001 in Ithaca, New York at Cornell University. ESW was based at Cornell from 2001 through August 30, 2007, when it moved its headquarters to the San Francisco Bay Area. In July 2011, ESW moved its headquarters to Merced, California at the University of California, Merced. In July 2013, the organization became an independent legal entity with its headquarters currently in Pittsburgh, Pennsylvania.

42. Which one of the following is NOT covered under the International Labour Organization declaration on fundamental principles and rights at work (1998)?
- (a) Freedom of association and the right to collective bargaining
 - (b) The elimination of forced and compulsory labour
 - (c) The abolition of child labour
 - (d) The global compact on migration

42. Ans: (d)

Sol: Adopted in 1998, the International Labour Organization Declaration commits Member States to respect and promote principles and rights in four categories. These categories are: freedom of association and the effective recognition of the right to collective bargaining, the elimination of forced or compulsory labour, the abolition of child labour and the elimination of discrimination in respect of employment and occupation.

43. Which one of the following does NOT come under business ethics?
- (a) Avoid breaking the law
 - (b) Avoid actions that are bad for one's image
 - (c) Avoid action
 - (d) Avoid conflict

43. Ans: (b)

Sol:

Requirements: Being ethical in business requires acting with an awareness of

- (a) The need for complying with rules (e.g)
 - (i) Laws of the land,
 - (ii) Customs and expectation of the community
 - (iii) Principles of morality
 - (iv) Policies of the organization and
 - (v) General concerns such as the needs of others and fairness.
- (b) How the products, services and actions of a business enterprise, can affect its stakeholders (i.e. employees, customers, suppliers, shareholders and community society as a whole) either positively or negatively.

44. Which one of the following principles refers to whom may be affected by the actions of the company that affect health, safety, or the environment and refrain from taking reprisals against employees who report dangerous incidents to management or appropriate authorities?

- (a) Safe product and service
- (b) Informing the public
- (c) Environmental restoration
- (d) Risk reduction

44. Ans: (b)

Sol:

It is actually Whistle blowing principle

45. The Defence Research and Development Organization (DRDO) has successfully test-fired medium-range subsonic cruise missile Nirbhay from the Integrated Test Range (ITR) at
- (a) Chandipur, Odisha
 - (b) Cuddalore, Tamil Nadu
 - (c) Nellore, Andhra Pradesh
 - (d) Digha, West Bengal

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45. Ans: (a)

Sol: Defence Research and Development Organisation (DRDO) fired the 1,000-km range Nirbhay subsonic cruise missile on June 24, 2021, from an Integrated Test Range (ITR) at Chandipur testing facility in Odisha. This was the eighth test flight of the missile.

46. Which one of the following is NOT correct regarding the Khel Ratna Award?

- (a) The award was inaugurated in 1991-92
- (b) The award comprises a medallion a certificate, and a cash prize of ₹ 15 lakh
- (c) The first recipient of the Khel Ratna was chess legend, Viswanathan Anand
- (d) The award renamed as Major Dhyan Chand Khel Ratna Award

46. Ans:(b)

Sol: The Khel Ratna Award is officially known as the Major Dhyan Chand Khel Ratna Award and formerly known as the Rajiv Gandhi Khel Ratna Award. It is the highest sporting honour of India. It is awarded annually by the Ministry of Youth Affairs and Sports. The award comprises a medallion, a certificate, and a cash prize of ₹25 lakh. Instituted in 1991–1992, the award was given for the performance by a sportsperson in a year. The first recipient of the award was Chess Grandmaster Viswanathan Anand, who was honoured for the performance in the year 1991–92.

47. How many Indian companies have found a place in 2021 Fortune's Global 500 list?

- (a) Three
- (b) Five
- (c) Seven
- (d) Nine

47. Ans: (c)

Sol: Seven Indian companies have found a place in 2021 Fortune's Global 500 list. The Fortune Global 500 is an annual ranking of the top 500 enterprises globally, as measured by business revenues.

Indian Companies in the list:

- Reliance Industries (155)

- State Bank of India (205)
- Indian Oil (212)
- Oil & Natural Gas (243)
- Rajesh Exports (348)
- Tata Motors (357)
- Bharat Petroleum (394)

The top 10 Global Companies in the list:

1. Walmart (US)
2. State Grid (China)
3. Amazon.com (US)
4. China National Petroleum (China)
5. Sinopec (China)
6. Apple (US)
7. CVS Health (US)
8. UnitedHealth Group (US)
9. Toyota Motor (Japan)
10. Volkswagen (Germany)

48. Which one of the following is NOT important initiatives under EASE 4.0 ?

- (a) Smart lending for aspiring India
- (b) New age 24 × 7 banking with resilient technology
- (c) Collaborative banking for synergistic outcomes
- (d) Parameters of FI-Index

48. Ans: (d)

Sol: Ease 4.0 is a reform for the Public Sector Banks to ensure smart banking. It was presented by the finance minister to be implemented by the Indian Banks Association. The key issues touched upon in the EASE 4.0 reforms are co-lending with non-banking firms, digital, agriculture financing, and technological resilience for 24x7 banking. A huge focus has been given to data analytics, automation, and digitization.

The key aspects under EASE 4.0 are:

- Digital Lending
- Mobile/ Internet Banking and Customer Service

- Date Enabled Agricultural Financing
- Collaborating with Financial Ecosystem

49. Which one of the following statements is NOT correct regarding the Pension Fund Regulatory and Development Authority (PERDA)?

- (a) It has increased Pension System (NPS) from 60 years to 65 years
- (b) Earlier the eligible age to invest in NPS was 18-65 years which has now been revised to 18-70 years
- (c) As per the revised norms, any Indian Citizen, resident or nonresident and Overseas Citizen of India (OCI) between the age of 65-70 years can join NPS
- (d) Subscribers can continue or defer their NPS Account up to the age of 75 years

49. Ans: (a)

Sol: Pension Fund Regulatory and Development Authority is the regulatory body under the jurisdiction of Ministry of Finance, Government of India for overall supervision and regulation of pension in India.

Senior citizens up to 70 years of age are also allowed to open a National Pension System (NPS) account. Earlier, Pension Fund Regulatory and Development Authority (PFRDA) had increased the maximum age of joining under NPS from 60 years to 65 years of age. Now, any Indian Citizen, resident or non-resident and Overseas Citizen of India (OCI) between the age of 65-70 years can also join NPS and continue or defer their NPS Account up to the age of 75 years.

50. World's largest star sapphire cluster has been found in

- (a) Rajkot, India
- (b) Ratnapura, Srilanka
- (c) Pretoria, South Africa
- (d) Brisbane, Australia

50. Ans: (b)

Sol: The world's largest sapphire cluster from Ratnapura, Sri Lanka has entered the Guinness Book of World Records. Named "Serendipity Sapphire," the pale-blue sapphire weighs over 300 kg and was found in a gem pit in the country in July 2021.

51. Consider the following statements regarding Cybersecurity Multi-Donor Trust Fund:

1. The world Bank has launched as new 'Cybersecurity Multi-Donor Trust Fund', to better roll our cybersecurity development agenda in a systematic manner.
2. The new fund has been developed as an associated trust fund under the broader Digital Development Partnership (DDP) umbrella program.
3. World Bank has partnered with four countries, namely Estonia, Japan, Germany, and the Netherlands, to launch the fund.

Which of the above statements are correct.

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

51. Ans: (d)

Sol: The World Bank announced the launch of a new Trust Fund on Cybersecurity. This Multi-Donor Trust Fund, developed as an associated trust fund under the broader Digital Development Partnership Umbrella (DDP), aims to better define, understand, articulate, structure, and roll-out the cybersecurity development agenda in a systematic manner.

The emerging work program will offer comprehensive cybersecurity capacity development, including development of global knowledge, country assessments, technical assistance, capacity building and training, underpinned with necessary investments in infrastructure and technology.

The launch of the Trust Fund has been made possible with donor contributions from Estonia, Germany, Japan, and The Netherlands.

52. Consider the following statements regarding Hydrogen Breakthrough Ironmaking Technology:

1. Swedish green steel venture HYBRIT, which had made the 'world's first' customer delivery of steel produced with using coal.
2. The steel was made using Hydrogen Break through Ironmaking Technology, which uses 100% fossil-free hydrogen instead of coal and coke.
3. The venture has started delivering the fossil-free steel to the Volvo Group as part of its trial run.

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 2 only

52. Ans: (b)

Sol: Hydrogen Breakthrough Ironmaking Technology (HYBRIT) is a groundbreaking effort to reduce CO₂ emissions and de-carbonise the steel industry. The goal is to have a solution for fossil-free steel by 2035. The HYBRIT technology involves replacing the blast furnace process, which uses carbon and coke to remove the oxygen from iron ore, with a direct reduction process where we use fossil-free hydrogen produced from water using electricity from fossil-free energy sources. Instead of carbon dioxide, water vapor is formed.

The first delivery of 'green steel' was done in Sweden by Hybrit to truck-manufacturer Volvo AB as a trial run. Owned by SSAB, Hybrit started test operations at its pilot plant for fossil-free steel in Lulea, northern Sweden, a year ago.

53. US-based Ohmium International has started India's first green hydrogen electrolyzer manufacturing unit at
- (a) Pune, Maharashtra
 - (b) Hyderabad, Telangana
 - (c) Bengaluru, Karnataka
 - (d) Noida, Uttar Pradesh

53. Ans: (c)

Sol: US-based Ohmium International has started India's first green hydrogen electrolyzer manufacturing unit at Bengaluru, Karnataka. The factory will manufacture India-made Proton Exchange Membrane (PEM) hydrogen electrolyzers. Green hydrogen is made from non-fossil sources as against blue hydrogen that is made from fossil sources.

About the Hydrogen Electrolyzer Gigafactory:

The gigafactory will manufacture India-made Proton Exchange Membrane (PEM) hydrogen electrolyzers with an initial manufacturing capacity of about 500 MW per year and will scale it up to 2 GW per year.

The PEM hydrogen electrolyzer is the main equipment for the production of green hydrogen as it uses power generated from renewable resources to break water into hydrogen and oxygen.

54. Which one of the following ministries has repealed the Unmanned Aircraft System (UAS) Rules, 2021 and replaced the same with the liberalized Drone Rules, 2021?

- (a) Ministry of Home Affairs
- (b) Ministry of Defence
- (c) Ministry of Science and Technology
- (d) Ministry of Civil Aviation

54. Ans: (d)

Sol: In March 2021, the Ministry of Civil Aviation (MoCA) published the UAS Rules, 2021. They were perceived by academia, Startups, end-users and other stakeholders as being restrictive in nature as they involved considerable paperwork, required permissions for every drone flight and very few "free to fly" green zones were available. Based on the feedback, the Government has decided to repeal the UAS Rules, 2021 and replace the same with the Liberalised Drone Rules, 2021.

Unmanned Aircraft Systems (UAS), commonly known as drones, offer tremendous benefits to

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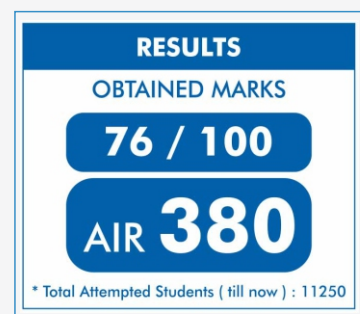
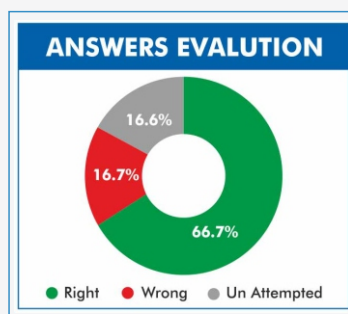
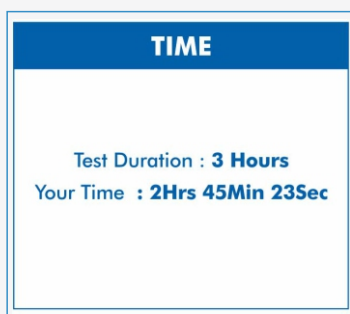
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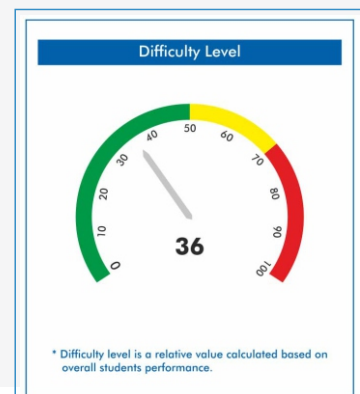
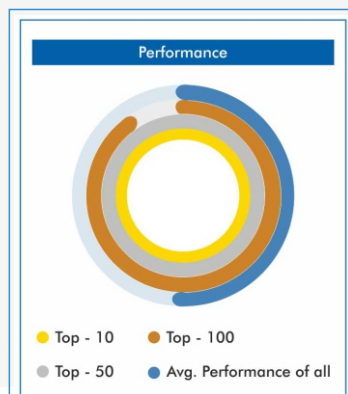
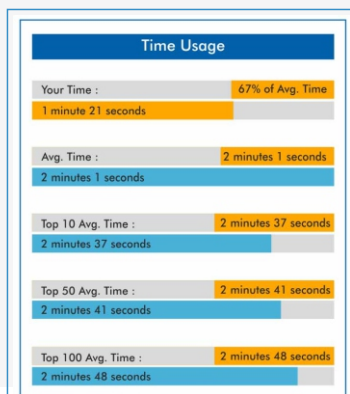
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almost all sectors of the economy like – agriculture, mining, infrastructure, surveillance, emergency response, transportation, geo-spatial mapping, defence, and law enforcement etc.

Drones can be significant creators of employment and economic growth due to their reach, versatility, and ease of use, especially in India’s remote and inaccessible areas. In view of its traditional strengths in innovation, information technology, frugal engineering and huge domestic demand, India has the potential to be global drone hub by 2030.

55. Consider the following statements regarding Forum for Decarbonizing Transport:

1. NITI Aayog and World Resources Institute (WRD), India, jointly launched the ‘Forum for Decarbonizing Transport’ in India.
2. NITI Aayog is the implementing partner for India.
3. The aim of the project is to bring down the peak level of GHG emissions (transport sector) in Asia (in line with a well below 2-degree pathway), resulting in problems like congestion and air pollution.

Which of the above statements are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

55. Ans: (d)

Sol: NITI Aayog and World Resources Institute(WRI), India, jointly launched the ‘Forum for Decarbonizing Transport’ in India as part of the NDC-Transport Initiative for Asia (NDC-TIA) project. The project aims at bringing down the peak level of GHG emissions (transport sector) in Asia (in line with a well below 2-degree pathway), resulting in problems like congestion and air pollution.

The NDC-TIA India component focuses on developing a coherent strategy of effective policies and the formation of a multi-stakeholder platform for decarbonizing transport in the country. Through this forum, the WRI India team, along with NITI Aayog and other project partners, will work in close coordination with all these stakeholders to formulate

strategies and develop appropriate business models to accelerate electric mobility in India. The forum will also provide a platform to initiate dialogues for the development of uniform policies and help achieve specific results in reducing emissions from the transport sector.

Through various policy measures and initiatives, the Government of India is continuously working towards the decarbonisation of road transport, with a major focus on the adoption of electric vehicles (EVs) in the country. NITI Aayog has been at the helm of the promotion of EVs and sustainable mobility through the National Mission on Transformative Mobility and Battery Storage.

56. Which one of the following national parks has become the first national park in India to be equipped with satellite phones?

- (a) Kaziranga National Park in Assam
(b) Sundarbans National Park in West Bengal
(c) Desert National Park In Rajasthan
(d) Indravati National Park in Chhattisgarh

56. Ans: (a)

Sol: Assam’s Kaziranga National Park (KNP) has become the first national park in India to be equipped with satellite phones. This first-of-its-kind move was taken to provide assistance to prevent poaching and ensure coordinated functioning.

57. Which one of the following cities has been named as the world’s safest city from among 60 global cities, in safe Cities Index 2021, released by the Economist Intelligence Unit (EIU)?

- (a) Yangon (b) Copenhagen
(c) New York (d) Toronto

57. Ans: (b)

Sol: Copenhagen, the capital city of Denmark, has been named as the world’s safest city from among 60 global cities, in Safe Cities Index 2021, released by the Economist Intelligence Unit (EIU).

About the Safe Cities Index 2021:

- The EIU's Safe Cities Index is a global, policy benchmarking tool developed to measure global urban safety. The Index was first released in 2015.
- In 2021, cities are ranked based on 76 indicators of security across five broad pillars, which are digital, health, infrastructure, personal and environmental.
- Environmental security is the new addition in the security parameters list for the year 2021.

Cities score on a scale of 0 to 100 where score denotes the safety in the following manner:

- 0-25 – Low Safety
- 25.1-50 – Medium Safety
- 50.1-75 – High Safety
- 75.1-100 – Very High Safety

From India:

New Delhi and Mumbai have found a place in the index. New Delhi is placed at 48th position with a score of 56.1, while Mumbai is at 50th place with a score of 54.4.

World's top 10 Safest cities

- Copenhagen
- Toronto
- Singapore
- Sydney
- Tokyo
- Amsterdam
- Wellington
- Hong Kong
- Melbourne
- Stockholm

58. The First-ever G20 Ministerial Conference on Women's Empowerment was held at
- (a) Vienna, Austria
 - (b) Hamburg, Berlin
 - (c) Geneva, Switzerland
 - (d) Santa Margherita Ligure, Italy

58. Ans: (d)

Sol: The First-ever G20 Ministerial Conference on Women's Empowerment was held at Santa Margherita Ligure, Italy. It was held in mixed format i.e people participated in physical form and via video conference also.

About the G20 Conference:

G20 Conference on Women Empowerment acknowledged the common objectives and shared responsibilities to advance the goals of equality and development of women and girls in all spheres including STEM, Financial and Digital Literacy, Environment and Sustainability.

The Union Minister of Women & Child Development, Smt. Smriti Irani addressed the meet on behalf of India. The Union Minister reaffirmed India's commitment towards addressing gender and women-centric issues through mutual cooperation.

59. Which one of the following countries did the Indian Navy participate in the U.S. Navy-led Southeast Asia Cooperation and Training (SEACAT) military exercise, to demonstrate its maritime manoeuvres?
- (a) Malaysia
 - (b) Australia
 - (c) Singapore
 - (d) New Zealand

59. Ans: (c)

Sol: The Indian Navy participated in the U.S. Navy-led Southeast Asia Cooperation and Training (SEACAT) military exercise in Singapore, to demonstrate its maritime manoeuvres. The main objective of SEACAT 2021 was to enhance the interoperability and shared maritime security concerns and preserve rules-based international order. The exercise comprised approximately 400 personnel and 10 ships.

About SEACAT:

SEACAT was held for the first time in 2002. The exercise aims to foster enhanced cooperation between Southeast Asian countries by incorporating standardized training, tactics and procedures when faced with crisis, contingencies or illegal activities in the maritime domain.

60. Most serious students are happy students, and most serious students go to graduate school. Furthermore, all students who go to graduate school are overworked.

Which one of the following can be properly inferred from the statements above?

- (a) Most overworked students are happy students
- (b) Some happy students are overworked
- (c) All overworked students are serious students
- (d) Some unhappy students go to graduate school

60. Ans: (b)

61. Some environmentalists question the prudence of exploiting features of the environment, arguing that there are no economic benefits to be gained from forests, mountains, or wetlands that no longer exist. Many environmentalists claim that because nature has intrinsic value it would be wrong to destroy such features of the environment, even if the economic costs of doing so were outweighed by the economic costs of not doing so.

Which one of the following can be logically inferred from the passage?

- (a) It is economically imprudent to exploit features of the environment.
- (b) Some environmentalists appeal to a noneconomic justification in questioning the defensibility of exploiting features of the environment.
- (c) Most environmentalists appeal to economic reasons in questioning the defensibility of exploiting features of the environment.
- (d) Many environmentalists provide only a noneconomic justification in questioning the defensibility of exploiting features of the environment.

61. Ans: (b)

Sol:

Option A: This is a general statement and it doesn't include the "economic" factor. The economists say it is wrong for a specific case and not for every case.

Option B: Most economists appeal to non economic

justification (intrinsic value) while questioning the exploiting features of the environment.

We can infer some from many.

Option C: It is actually contradicting the argument.

Option D: The word **only** is strong word and cannot be inferred from the above premises.

62. Some argue that laws are instituted at least in part to help establish a particular moral fabric in society. But the primary function of law is surely to help order society so that its institutions, organizations, and citizenry can work together harmoniously, regardless of any further moral aims of the law. Indeed, the highest courts have on occasion treated moral beliefs based on conscience or religious faith as grounds for making exceptions in the applications of laws.

- (a) The manner in which laws are applied sometimes takes into account the beliefs of the people governed by those laws.
- (b) The law has as one of its functions the ordering of society but is devoid of moral aims.
- (c) Actions based on religious belief or on moral conviction tend to receive the protection of the highest courts.
- (d) The way a society is ordered by law should not reflect any moral convictions about the way society ought to be ordered.

62. Ans: (a)

Sol:

Option (a): This correct answer is largely a paraphrase of the last sentence.

Option (b): While the author certainly agrees with the first part of the sentence, in the second part the phrase "devoid of moral aims" is too strong to be supported by the information in the stimulus. The last sentence indicates that morality has some effect on the law and invalidates the "devoid" claim.

Option (c): This is an exaggerated answer. Although the last sentence indicates that religious faith has been grounds for making exceptions in the application of law, the stimulus does not indicate that actions based on religious the protection of the highest courts.

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Option (d): The author indicates that the “primary function” of law is to help order society; the author does not indicate that this is the one and only function of law. The answer choice overstates the case by saying that a society ordered by law should not reflect any moral convictions about the ordering.

63. Unlike newspapers in the old days, today’s newspapers and televised news programs are full of stories about murders and assaults in our city. One can only conclude from this change that violent crime is now out of control, and, to be safe from personal attack, one should not leave one’s home except for absolute necessities.

Which one of the following, if true, would cast the most serious doubt on the conclusion.

- (a) Newspapers and televised news programs have more comprehensive coverage of violent crime than newspapers did in the old days.
- (b) National data show that violent crime is out of control every where, not just in the author’s city.
- (c) Police records show that people experience more violent crimes in their own neighborhoods than they do outside their neighborhoods.
- (d) Murder comprised a larger proportion of violent crimes in the old days than it does today.

63. Ans: (a)

Sol:

Option (a): Violent crime might have been out of control since old days. Only that media didn’t cover it well in those times

Option (b): Conclusion compares today vs, old days not author’s neighborhood vs everywhere else.

Option (c): Where the crime is committed is irrelevant.

Option (d): Narrow. Talks only about murder.

64. Fact 1 : Jessica has four children.

Fact 2 : Two of the children have blue eyes and two of the children have brown eyes.

Fact 3 : Half of the children are girls.

If the first three statements are facts, which of the following statements must also be a fact.

- I. At least one girl has blue eyes.
- II. Two of the children are boys.
- III. The boys have brown eyes.

Select the correct answer using the code given below:

- (a) II only
- (b) I and III only
- (c) II and III only
- (d) None of the statements is a known fact

64. Ans: (a)

Sol: Jessica has 4 children.

Half of children are girls

⇒ 2 children are girls

⇒ 2 children are boys

Option (a) II only

65. Children are in pursuit of a dog whose leash has broken. James is directly behind the dog. Ruby is behind James. Rachel is behind Ruby. Max is ahead of the dog walking down the street in the apposite direction. As the children and dog pass, Max turns around and joins the pursuit. He runs in behind Ruby, James runs faster and is alongside the dog on the left. Ruby runs faster and is alongside the dog on the right. Which child is directly behind the dog.

- (a) James
- (b) Ruby
- (c) Rachel
- (d) Max

65. Ans: (d)

Sol: After all switches their positions Max is directly behind the Dog.

James is along side the dog on left and Ruby is Right.

66. At the baseball game, Henry was sitting in seat 253. Marla was sitting to the right of Henry in seat 254. In the seat to the left of Henry was George. Inez was sitting to the left of George. Which seat is Inez sitting in?

- (a) 251 (b) 254
 (b) 255 (d) 256

66. Ans: (a)

Sol: Inez George Henry Marla

251 252 253 254

Inez is sitting in seat 251.

67. The difference between simple interest and compound interest on a sum for 2 years at 8% when the interest is compounded annually is ₹16. If the interest were compounded half yearly the difference in two interests would be nearly.

- (a) ₹21.35 (b) ₹24.64
 (c) ₹27.85 (d) ₹29.94

67. Ans: (b)

Sol: Given $P\left(\frac{R}{100}\right)^2 = 16$

$$\Rightarrow P \times \frac{64}{100 \times 100} = 16$$

$$P = 2500$$

$$\text{CI for 2 years @ 8\% p.a (companded half yearly)} = 2500 (104\%)^4 - 2500 = 424.6464$$

$$\text{SI for 2 years @ 8\% p.a} = 16\% \text{ principal} = 400$$

$$\text{Difference} = 424.6464 - 400 = 24.6464$$

68. A library has two books each having three copies and three other books each having two copies. In how many ways can all these books be arranged in a shelf so that copies of the same book are not separated?

- (a) 80 (b) 100
 (c) 120 (d) 140

68. Ans: (c)

Sol: $\underbrace{A, A, A | B, B, B | C, C | D, D | E, E}_{5 \text{ different books}}$

No. of ways of arranging same books not separate
 $= 5! \times 1! \times 1! \times 1! \times 1! \times 1! = 120$

Alternate solution

A library has two books

↓

Each having 3 copies.

3 other Books → Each having → Two copies.

Overall, we had only 5 Books.

Arranged as $5! = 120$

(Same copy books set consider as 1 copy only).

69. 21 mango trees, 42 apple trees and 56 orange trees have to be planted in rows such that each row contains the same number of trees of one variety only. Minimum number of rows in which the above trees may be planted is

- (a) 9 (b) 12
 (c) 14 (d) 17

69. Ans: (d)

Sol: HCF (21, 42, 56) = 7

$$21 = 7 \times 3$$

$$42 = 7 \times 6$$

$$56 = 7 \times 8$$

$$\text{Minimum no. of rows} = 3 + 6 + 8 = 17$$

70. A general wishes to draw up his 36562 soldiers in the form of a solid square. After arranging them, he found that some of them are left over. How many are left.

- (a) 81 (b) 75
 (c) 61 (d) 52

70. Ans: (a)

Sol: $191 \times 191 = 36481$

$$36562 - 36481 = 81 \text{ soldiers left.}$$

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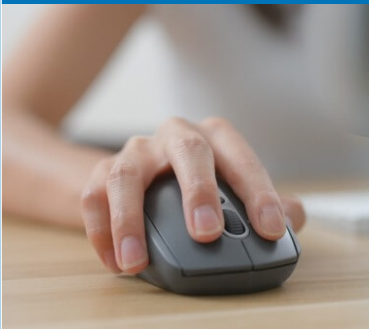
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71. A tank can be filled by 20 buckets each of capacity 13.5 litres. If the capacity of each bucket be 9 litres, how many buckets will fill the same tank?

- (a) 30 (b) 25
(c) 20 (d) 15

71. Ans: (a)

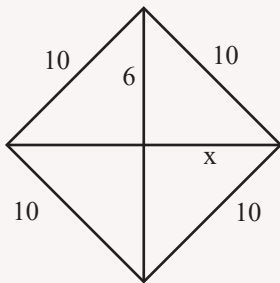
Sol: $20 \times 13.5 = n \times 9$
 $n = 30$

72. One side of a rhombus is 10 cm and one of its diagonals is 12 cm. The area of the rhombus is

- (a) 24 sq. cm (b) 48 sq. cm
(c) 72 sq. cm (d) 96 sq. cm

72. Ans: (d)

Sol:



$x = 8$

So, diagonal₁ = 12cm (given)

diagonal₂ = $8 \times 2 = 16\text{cm}$

Area of Rhombus = $\frac{1}{2} \times d_1 \times d_2 = 96 \text{ cm}^2$

73. Two boys begin together to write out to booklet containing 817 lines. The first boy starts with first line, writing at the rate of 200 lines an hour and the second boy starts with the last line. He writes line 817 and so on back wards proceeding at the rate of 150 lines an hour. At what line will they meet?

- (a) 469th (b) 467th
(c) 465th (d) 463rd

73. Ans: (b)

Sol: Time = $\frac{817}{200 + 150} = \frac{817}{350}$

Time = $2 \frac{117}{350}$ hrs

Line they meet = $2 \left(\frac{117}{350} \right) \times 200$

= $400 + \frac{117 \times 200}{350}$

= $400 + \frac{468}{7}$

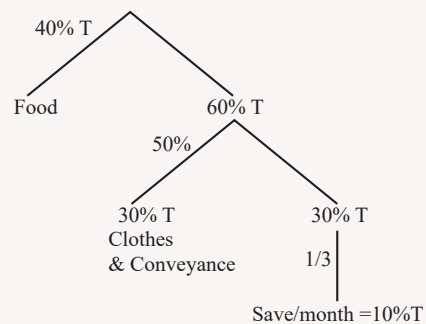
= $400 + 66 \frac{6}{7} = 467^{\text{th}}$ line

74. Rohith spends 40% of his monthly income on food items and 50% of the remaining on clothes and conveyance. He saves one-third of the remaining amount after spending on food, clothes and conveyance. If he saves ₹19,200 every year, what is his monthly income?

- (a) ₹32,000 (b) ₹16,000
(c) ₹12,000 (d) ₹6,000

74. Ans: (b)

Sol: Total monthly income = T
Total monthly income = T



Save/month = 10%T

Given save/year = 19200

\Rightarrow Save/month = 10%T = $\frac{19200}{12}$

$\Rightarrow T = 16000$

75. The value of $L^{-1} \left\{ \frac{5s^2 + 8s - 1}{(s + 3)(s^2 + 1)} \right\}$ is

- (a) $2e^{-3t} + 3\cos t - \sin t$
(b) $2e^{-3t} - 3\cos t + \sin t$
(c) $3e^{-3t} + 2\cos t - \sin t$
(d) $3e^{-3t} - 2\cos t + \sin t$

75. Ans: (a)

Sol: Let $\frac{5s^2 + 8s - 1}{(s+3)(s^2+1)} = \frac{A}{s+3} + \frac{Bs+C}{s^2+1}$

Then $5s^2 + 8s - 1 = A(s^2 + 1) + (s + 3)(Bs + C) \dots (1)$

For $s = -3, 45 - 24 - 1 = 10A$

$\Rightarrow A = 2$

For $s = 0, -1 = 2 + (0 + 3)(0 + c)$

$\Rightarrow c = -1$

Equating the coefficient of s^2 in (1),

we get $5 = A + B$

$\Rightarrow B = 3$

$$L^{-1} \left\{ \frac{5s^2 + 8s - 1}{(s+3)(s^2+1)} \right\}$$

$$= L^{-1} \left\{ \frac{2}{s+3} \right\} + L^{-1} \left\{ \frac{3s + (-1)}{s^2+1} \right\}$$

$$= 2e^{-3t} + 3\cos(t) - \sin(t)$$

76. What is the Laplace transform of $2e^{3t}(4 \cos 2t - 5 \sin 2t)$?

(a) $\frac{8s + 44}{s^2 + 6s - 13}$ (b) $\frac{4s - 44}{s^2 - 6s + 13}$

(c) $\frac{4s + 44}{s^2 + 6s - 13}$ (d) $\frac{8s - 44}{s^2 - 6s + 13}$

76. Ans: (d)

Sol: $4\cos 2t - 5\sin 2t \xrightarrow{L.T} \frac{(4)(s)}{s^2+2^2} - \frac{(5)(2)}{s^2+2^2} = \frac{4s-10}{s^2+4}$

$$2e^{3t}[4 \cos 2t - 5 \sin 2t] \xrightarrow{L.T} 2 \frac{[4(s-3) - 10]}{(s-3)^2 + 4}$$

$$= \frac{8s - 44}{s^2 - 6s + 13}$$

77. A batch of 100 capacitors contains 73 which are within the required tolerance values, 17 which are below the required tolerance values, and the remaining are above the required tolerance values. What is the probability that when randomly selecting a capacitor and then a second capacitor, if both are within the required tolerance values when selecting with replacements?

(a) 0.3319 (b) 0.5329

(c) 0.7239 (d) 0.9249

77. Ans: (b)

Sol: The probability of selecting a capacitor with in the required tolerance value is $\frac{73}{100}$.

The probability that when randomly selecting a capacitor and then a second capacitor, if both are within the required tolerance values when selecting with replacement is

$$= \frac{73}{100} \times \frac{73}{100} = \frac{5329}{10000} = 0.5329$$

78. The value of $\int_0^4 \sqrt{(16-x^2)} dx$ is

(a) π (b) 2π

(c) 3π (d) 4π

78. Ans: (d)

Sol: Let $x = 4 \sin \theta$

Then $dx = 4 \cos \theta d\theta$

x	θ
0	0
4	$\pi/2$

Let $I = \int_0^{\pi/2} 4 \cos \theta (4 \cos \theta) d\theta$

Then $I = 16 \int_0^{\pi/2} \left(\frac{1 + \cos 2\theta}{2} \right) d\theta$

$\therefore I = 8 \cdot \frac{\pi}{2} = 4\pi$

79. The value of $\int_0^2 \frac{3x}{\sqrt{(2x^2+1)}} dx$ is

(a) 1 (b) 2

(c) 3 (d) 4

79. Ans: (c)

Sol: Let $I = \frac{3}{4} \int_0^2 \frac{4x}{(2x^2+1)^{1/2}} dx$

Then $I = \frac{3}{4} \left(\frac{(2x^2+1)^{-1/2+1}}{-1+1} \right)_0^2$

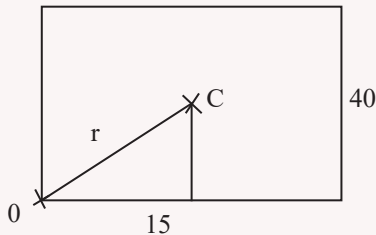
$\therefore I = \frac{3}{2} (3 - 1) = 3$

80. What is the radius of gyration of a rectangular lamina of length 40 mm and width 15 mm about an axis through one corner, perpendicular to the plane of the lamina?

- (a) 12.7 cm (b) 2.47 cm
(c) 3.67 cm (d) 4.87 cm

80. Ans: (b)

Sol:



$$r = \sqrt{7.5^2 + 20^2}$$

$$r = 21.36 \text{ cm}$$

$$I_C = \frac{1}{12} \times 15 \times 40^3 + \frac{1}{12} \times 40 \times 15^3$$

$$I_C = \frac{1}{12} \times 15 \times 40 [40^2 + 15^2] = 91250$$

$$I_0 = I_C + A \times r^2$$

$$I_0 = [91250 + 15 \times 40 \times 21.36^2]$$

$$I_0 = A \times K^2$$

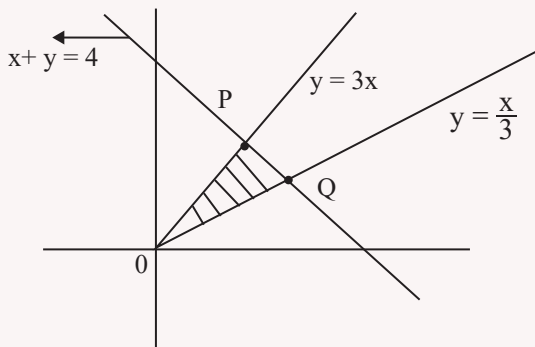
$$\Rightarrow K = 2.47 \text{ cm}$$

81. By integration the area bounded by the three straight lines $y = 4 - x$, $y = 3x$ and $3y = x$ is

- (a) 2 square units
(b) 3 square units
(c) 4 square units
(d) 5 square units

81. Ans: (c)

Sol:



$$x + y = 4$$

$$x + 3x = 4$$

$$\Rightarrow x = 1, 3$$

$$\overline{OP} = i + 3j$$

$$x + y = 4$$

$$3y = x$$

$$4y = 4$$

$$\Rightarrow y = 1 \Rightarrow x = 3$$

$$\overline{OQ} = 3i + j$$

$$\text{Area} = \frac{1}{2} \begin{vmatrix} i & i & k \\ 1 & 3 & 0 \\ 3 & 1 & 0 \end{vmatrix} = \frac{1}{2}(8) = 4$$

82. The power series for $\ln\left(\frac{1+x}{1-x}\right)$ is

(a) $\left(x + \frac{x^3}{3} + \frac{x^5}{5} + \dots\right)$

(b) $2\left(x - \frac{x^3}{3} + \frac{x^5}{5} - \dots\right)$

(c) $2\left(x + \frac{x^3}{3} + \frac{x^5}{5} + \dots\right)$

(d) $\left(x - \frac{x^3}{3} + \frac{x^5}{5} - \dots\right)$

82. Ans: (c)

Sol: $\ln\left[\frac{1+x}{1-x}\right] = \ln(1+x) - \ln(1-x)$

$$= \left[x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots\right] - \left[-\left(x + \frac{x^2}{2} + \frac{x^3}{3} + \dots\right)\right]$$

$$= 2\left(x + \frac{x^3}{3} + \frac{x^5}{5} + \dots\right)$$

83. The mean value of $y = 3x^2 + 4x + 1$ between $x = -1$ and $x = 2$ is

- (a) 2 (b) 4
(c) 6 (d) 8

83. Ans: (c)

Sol: Mean value = $\frac{\int_{-1}^2 (3x^2 + 4x + 1) dx}{2 - (-1)}$

$$= \frac{(x^3 + 2x^2 + x)^2_{-1}}$$

$$= \frac{(8 + 8 + 2) - (-1 + 2 - 1)}{3} = 6$$

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and many more...

TOTAL 36 RANKS IN TOP 10

ME 10

EE 09

E&T 10

CE 07



84. What is the length of the curve $x = \cos^3 \theta$, $y = 2 \sin^3 \theta$ between the points corresponding to $\theta = 0$ and $\theta = \frac{\pi}{2}$?

- (a) 2 units (b) 3 units
 (c) 4 units (d) 5 units

84. Ans: 3

Sol: Given $x = 2 \cos^3 \theta$ and $y = 2 \sin^3 \theta$

$$\Rightarrow \frac{dx}{d\theta} = 6 \cos^2 \theta (-\sin \theta)$$

$$\& \frac{dy}{d\theta} = 6 \cos \theta \cdot \sin^2 \theta$$

The length of the curve in parametric form is given by

$$\text{Length } L = \int_{\theta=a}^b \sqrt{\left(\frac{dx}{d\theta}\right)^2 + \left(\frac{dy}{d\theta}\right)^2} d\theta$$

$$\Rightarrow L = \int_{\theta=0}^{\pi/2} \sqrt{[6 \cos^2 \theta (-\sin \theta)]^2 + [6 \sin^2 \theta \cdot \cos \theta]^2} d\theta$$

$$\Rightarrow L = \int_{\theta=0}^{\pi/2} \sqrt{36 \cos^2 \theta \cdot \sin^2 \theta (\cos^2 \theta + \sin^2 \theta)} d\theta$$

$$\Rightarrow L = \int_{\theta=0}^{\pi/2} 6 \cdot \cos \theta \cdot \sin \theta d\theta$$

$$\Rightarrow L = \int_{\theta=0}^{\pi/2} 3 \cdot \sin(2\theta) d\theta$$

$$\therefore L = 3 \left(\frac{\cos(2\theta)}{-2} \right)_0^{\pi/2} = \frac{-3}{2} [-1 - 1] = 3$$

85. What is the largest eigenvalue in modulus of the

matrix $A = \begin{pmatrix} 2 & 3 & 2 \\ 4 & 3 & 5 \\ 3 & 2 & 9 \end{pmatrix}$ with an initial vector $(1, 1, 1)^T$

by

- (a) 11.84 (b) 12.84
 (c) 13.84 (d) 14.84

85. Ans: (a)

Sol: $A = \begin{pmatrix} 2 & 3 & 2 \\ 4 & 3 & 5 \\ 3 & 2 & 9 \end{pmatrix}$

$$\text{Lev } V_0 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

$$\text{Then } Y_1 = AV_0 = \begin{pmatrix} 2 & 3 & 2 \\ 4 & 3 & 5 \\ 3 & 2 & 9 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 7 \\ 12 \\ 14 \end{pmatrix}$$

$$\Rightarrow V_1 = \begin{pmatrix} 7/14 \\ 12/14 \\ 14/14 \end{pmatrix}$$

$$Y_2 = AV_1 = \begin{pmatrix} 2 & 3 & 2 \\ 4 & 3 & 5 \\ 3 & 2 & 9 \end{pmatrix} \begin{pmatrix} 7/14 \\ 12/14 \\ 14/14 \end{pmatrix} = \begin{pmatrix} 78/14 \\ 134/14 \\ 171/14 \end{pmatrix}$$

$$\therefore \lambda_1 = \frac{78}{7} = 11.14$$

(or)

$$\frac{134}{12} = 11.16$$

(or)

$$\frac{171}{14} = 12.2$$

(a) is correct.

86. Reduce the matrix $A = \begin{bmatrix} 1 & 3 & 4 \\ 3 & 2 & -1 \\ 4 & -1 & 1 \end{bmatrix}$ to the tridiagonal form.

(a) $\begin{bmatrix} 1 & -5 & 0 \\ -5 & \frac{2}{3} & \frac{1}{5} \\ 0 & \frac{1}{5} & \frac{13}{5} \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 & -5 \\ -5 & \frac{2}{3} & -\frac{1}{5} \\ 0 & -\frac{13}{5} & \frac{1}{5} \end{bmatrix}$

(c) $\begin{bmatrix} 1 & -5 & 0 \\ -5 & -\frac{2}{5} & -\frac{13}{5} \\ 0 & \frac{1}{5} & \frac{1}{5} \end{bmatrix}$ (d) $\begin{bmatrix} 1 & -5 & 0 \\ -5 & -\frac{2}{5} & \frac{1}{5} \\ 0 & \frac{13}{5} & \frac{1}{5} \end{bmatrix}$

86. Ans: (a)

Sol: $A = \begin{pmatrix} 1 & 3 & 4 \\ 3 & 2 & -1 \\ 4 & -1 & 1 \end{pmatrix}$

$$\tan \theta = \frac{a_{13}}{a_{12}} = \frac{4}{3} \Rightarrow \sin \theta = \frac{4}{5} \& \cos \theta = \frac{3}{5}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix} \begin{pmatrix} 1 & 3 & 4 \\ 3 & 2 & -1 \\ 4 & -1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & -\frac{4}{5} \\ 0 & \frac{4}{5} & \frac{3}{5} \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix} \begin{pmatrix} 1 & 5 & 0 \\ 3 & \frac{2}{5} & -\frac{11}{5} \\ 4 & \frac{1}{5} & \frac{7}{5} \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 5 & 0 \\ 5 & 2 & -1 \\ 0 & -1 & 13 \end{pmatrix}$$

No option is correct.

87. From the Taylor series for $y(x)$, what is the value of $y(0.1)$ correct to four decimal places if $y(x)$ satisfies $y' = x - y^2$ and $y(0) = 1$?

- (a) 0.9138 (b) 0.7254
(c) 0.5286 (d) 0.3524

87. Ans: (a)

Sol: $y(x_1) = y(x_0) + f(x_0, y_0)h + f'(x_0, y_0) \frac{h^2}{2}$
 $= 1 + (0 - 1)(0.1) + \frac{3(0.1)^2}{2}$
 $= 1 - 0.1 + \frac{0.03}{2}$
 $= 0.915$

88. What is the shape of the curve represented by

$$\frac{x}{2} = \sqrt{1 + \left(\frac{y}{2}\right)^2}?$$

- (a) Hyperbola
(b) Rectangular hyperbola
(c) Parabola
(d) Ellipse

88. Ans: (a)

Sol: Given curve is $\frac{x}{5} = \sqrt{1 + \left(\frac{y}{2}\right)^2}$

$$\Rightarrow \frac{x^2}{25} = 1 + \frac{y^2}{4}$$

$$\Rightarrow \frac{x^2}{25} - \frac{y^2}{4} = 1$$

∴ The given curve is a hyperbola

89. What is the particular solution of the differential equation $5 \frac{dy}{dx} + 2x = 3$ if the boundary conditions

are $y = \frac{7}{5}$ and $x = 2$?

- (a) $y = \frac{3x}{5} - \frac{x^2}{5} + 1$
(b) $y = \frac{3x}{5} + \frac{x^2}{5} - 2$

(c) $y = \frac{5x}{3} - \frac{x^2}{3} + 1$

(d) $y = \frac{5x}{3} + \frac{x^2}{3} - 2$

89. Ans: (a)

Sol: Given $\frac{dy}{dx} = \frac{3 - 2x}{5}$ (1)

with $y(2) = 7/5$ (2)

Now $\int dy = \int \left(\frac{3 - 2x}{5}\right) dx + c$

$$\Rightarrow y = \frac{1}{5}(3x - x^2) + c$$

$$\therefore y(2) = \frac{7}{5}$$

$$\Rightarrow c + \frac{1}{5}(6 - 4) = \frac{7}{5}$$

$$\Rightarrow c + \frac{2}{5} = \frac{7}{5}$$

$$\Rightarrow c = \frac{-2}{5} + \frac{7}{5} = 1$$

∴ The solution of (1) is $y = \frac{3x - x^2}{5} + 1$

(or)

$$y = \frac{3x}{5} - \frac{x^2}{5} + 1$$

90. Which of the following factors are included in product realization process?

1. Marketing functions to assess customer requirements
2. Documentation of the design
3. Legal requirements

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

90. Ans: (d)

Sol: Product realization describes the collection of processes involved in a product's life cycle, from its conception to its completion. This term is all encompassing, and touches on every stage of design, development, manufacturing, packaging, shipping, and equipment maintenance. This also includes legal requirements (for shipping, quality claims, Intellectual Property rights etc.)

91. In general, which one of the following is NOT included in the list of parts or the bill of materials in an engineering drawing sheet?

- (a) Part number (b) Material Name
(c) Cost (d) Quantity

91. Ans: (c)

Sol: Bill of Materials in an Engineering Drawing Sheet generally contains Part number, part Name(description), Material, Quantity etc...

When Put on the Engineering Drawing (cost is a variable based on time and other factors)... So it is never put on drawings.

92. Continuous thin (narrow) with zigzags (straight) lines are generally used to represent

- (a) long-break line (b) hidden outline
(c) visible outline (d) reference line

92. Ans: (a)

93. When the receding lines are drawn to full size scale and the projectors inclined at an angle of 30° or 45° or 60° to the plane of projection, such oblique projection is known as

- (a) Cabinet projection
(b) Vertical projection
(c) Cavalier projection
(d) Horizontal projection

93. Ans: (c)

94. Which one of the following statements is correct about oblique projection?

- (a) The object is drawn with the reduced (about 82%) dimensions.
(b) All the faces of the object are distorted into the shape and size
(c) Projectors from an object are parallel to each other and perpendicular to the plane of picture.
(d) The faces of object which are perpendicular to the plane of projection will be distorted in the shape and size.

94. Ans: (d)

95. Which one of the following methods is used when the non-isometric lines or their ends lie in isometric planes?

- (a) Intersection method
(b) Box method
(c) Co - ordinate method
(d) Offset method

95. Ans: (b)

96. If a line is perpendicular to the V.P. and its V.T. coincides with its front view which is a point, then

- (a) V.T. is a point on H.P.
(b) H.T. is a point on V.P.
(c) it has no V.T.
(d) it has no H.T.

Directions :

Each of the next four (04) items consists of two statements, one labelled as the 'Statements (I). and the other as 'Statement (II)' You are to examine these two statements carefully and select the answers to these items using the codes given below.

Codes:

- (a) Both Statements (I) and Statements (II) are individually true and Statement (II) is the correct explanation of Statement (I)
(b) Both Statements (I) and Statement (II) are individually true but Statement (II) is **NOT** the correct explanation of Statement (I)
(c) Statement (I) is true but Statement (II) is false.
(d) Statement (I) is false but Statement (II) is true

96. Ans: (d)

97. **Statement (I) :** The drawings and machining processes can be automated using CAD/CAM change the primary function of these of these drawings and processes.

Statement (II) : The primary function is to provide information about the product to the designer and production people.

97. **Ans: (a)**

Sol: CAD/CAM has replaced stereotype drawings. CAD/CAM helps users creating designs in either 2D or 3D so that they can visualize the construction (Provides Information). CAD/CAM also helps in the development, testing, modification, and optimization of the design process.

98. **Statement (I)** : Environmental pollution has become global problem.

Statement (II) : The rapidly growing human population, rapid urbanization, intensive agriculture and industrialization together with human activities resulted in the environmental pollution.

98. **Ans: (a)**

Sol:

Environment pollution levels are continuously increasing in the atmosphere, it has become a global cause of concern. The major source are Rapid growing human population, rapid urbanization, Intensive agriculture and rapid industrialization.

99. **Statement (I)** : Content is the heart of any IT project.

Statement (II) : Implementation and maintenance of e-government projects through IT professional hired from the market is likely to result in failure of the project as the organization is bound to disown such outsiders.

99. **Ans: (c)**

Sol: For implementation of a project, we use 6C (Content, Citizen interface, Capital, Cyber law, Competencies, Connectivity) model. since in any IT project, the stakeholders must be IT professionals from different organisations and companies

100. **Statement (I)** : Social involvement discourages additional government regulation and intervention.

Statement (II) : Social involvement can create a weakened international balance of payments situation.

100. **Ans: (d)**

Hearty Congratulations to our

GATE - 2021 TOP RANKERS

AIR 1ST IN
PRATIK PRAKASH SHINDE

AIR 1ST EE
AAKASH DHILL

AIR 1ST ME
SUYASH SHARMA

AIR 1ST PI
GANESH ADIGAUR

AIR 1ST XE
VARUN KAUSHIK

AIR 2nd ME
JAY CHAVDA

AIR 2nd PI
GOWTHAM GUDIMELLA

AIR 2nd EC
M POOJASREE

AIR 2nd ES
ANUSH VERMA

AIR 3rd ME
MUNISH KUMAR

AIR 3rd ME
NUKULA VISWA TEJA

AIR 3rd PI
REHAN ANWAR DESAI

AIR 3rd EC
MANOJ KUMAR

AIR 3rd CE
SHASHIKANT KUMAR

AIR 3rd EE
JAYMAL KHUNTI

AIR 4th PI
ROHIT SONI

AIR 4th EC
PAKHIL

AIR 4th IN
DIVAKAR CH.

AIR 4th IN
SAURABH JAISWAL

AIR 4th XE
JATIN BHANDARI

AIR 4th ES
HEMANTH TIWARI

AIR 5th ME
ABHISHEKA

AIR 5th EC
VAISHNAV KV

AIR 5th CE
PRASHANT DWIVEDI

AIR 5th CS
PANKAJ LAHKAR

AIR 5th CS
S BHATTACHARJEE

AIR 5th PI
SUBHANSHU TIWARI

AIR 6th ME
ABHISHEK MEWAR

AIR 6th PI
AKASH JAISWAL

AIR 6th EC
PARAG SAROHA

AIR 6th IN
HARSHIT GUPTA

AIR 6th IN
RAJU SHARMA

AIR 6th CE
TANMAY MAHAJAN

AIR 6th XE
MANISH YADAV

AIR 7th ME
VATSAL PANCHAL

AIR 7th PI
SACHIN DUBOLIYA

AIR 7th PI
ATULYA JYOTHI

AIR 8th ME
RAJAT GUPTA

AIR 8th ME
ROHIT S PATIL

AIR 8th EC
ANKUR LAL MEENA

AIR 8th IN
KUNAL SAURAV

AIR 8th CE
PRANSHU JANGID

AIR 8th CE
RAHUL PATI

AIR 8th EE
UJJWAL KUMAR

AIR 8th EE
HEMANT JINDAL

AIR 9th EC
ABHISHEK SINGH

AIR 9th EC
ALEESHA ROSE

AIR 9th EC
SAI VAMSI DOSAPATI

AIR 9th IN
RAMESH KUMAR

AIR 9th CS
NIRANJAN NITIN DHOOT

AIR 9th XE
RACHIT KUMAR

AIR 10th ME
DEEPESH AGARWAL

AIR 10th PI
VYOM SHARMA

AIR 10th IN
PRAGYA KAUSHIK



AIR 10th CE
GOVIND PRASAD B

AIR 10th XE
D KUMAR PATIL

AIR 10th XE
R SHIVAJI NALE

and many more...



Total 57 Ranks in Top 10

ME : 10

PI : 09

CE : 08

EE : 4

EC : 09

CS : 03

IN : 08

XE : 06