ESE 2025
Prelims Paper-I

General Studies & Engineering Aptitude

Set-D

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General Studies and Engineering Aptitude Paper
Analysis of ESE 2025 Preliminary Examination

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2	Reasoning & Aptitude	15
3	Engineering Mathematics and Numerical Analysis	5
4	General Principles of Design, Drawing, Importance of Safety	9
5	Standards and Quality Practices in Production	9
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9	Information and Communication Technologies (ICT)	9
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UPSC ESE Prelims 2025 : Paper I

General Studies & Engg. Aptitude

Solutions *by* MADE EASY faculties

1. Ceramic raw materials are joined using a binder that does not require firing or sintering in a process called

(a) Coating
(b) Cementation
(c) Enamel
(d) Slip casting

Ans. (b)

Cementation involves joining ceramic raw materials using a binder that hardens at room temperature without requiring firing or sintering.

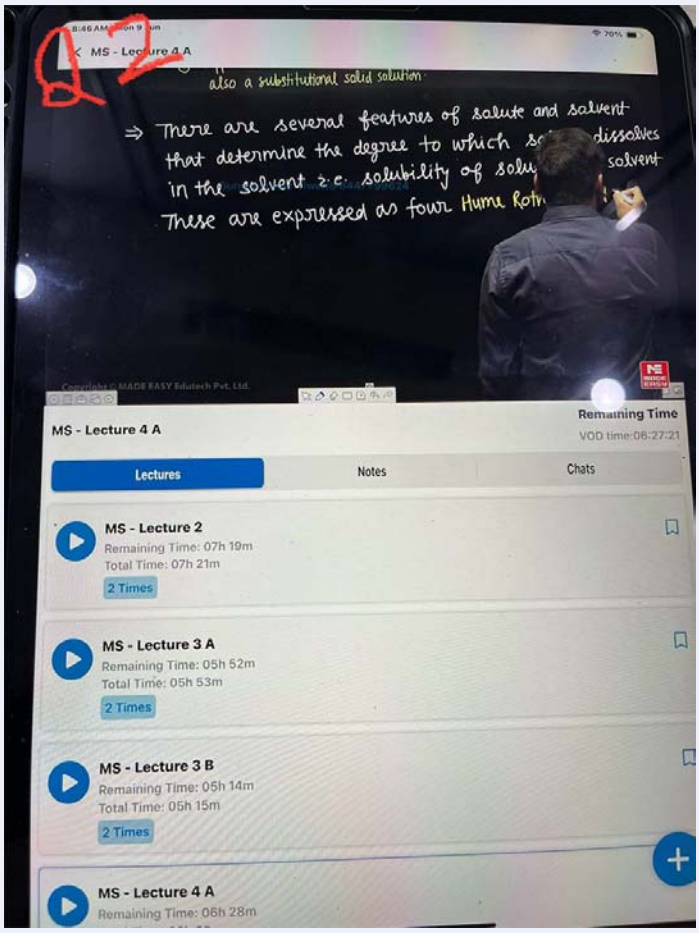
End of Solution

2. For many alloy systems at specific temperature, a maximum concentration of solute atoms that dissolve in the solvent to form a solid solution is

(a) Equilibrium of alloy
(b) Free energy
(c) System
(d) Solubility limit

Ans. (d)

For many alloy systems and at some specific temperature, there is a maximum concentration of solute atoms that may dissolve in the solvent to form a solid solution; this is called a **solubility limit**. The addition of solute in excess of this solubility limit results in the formation of another solid solution or compound that has a distinctly different composition.



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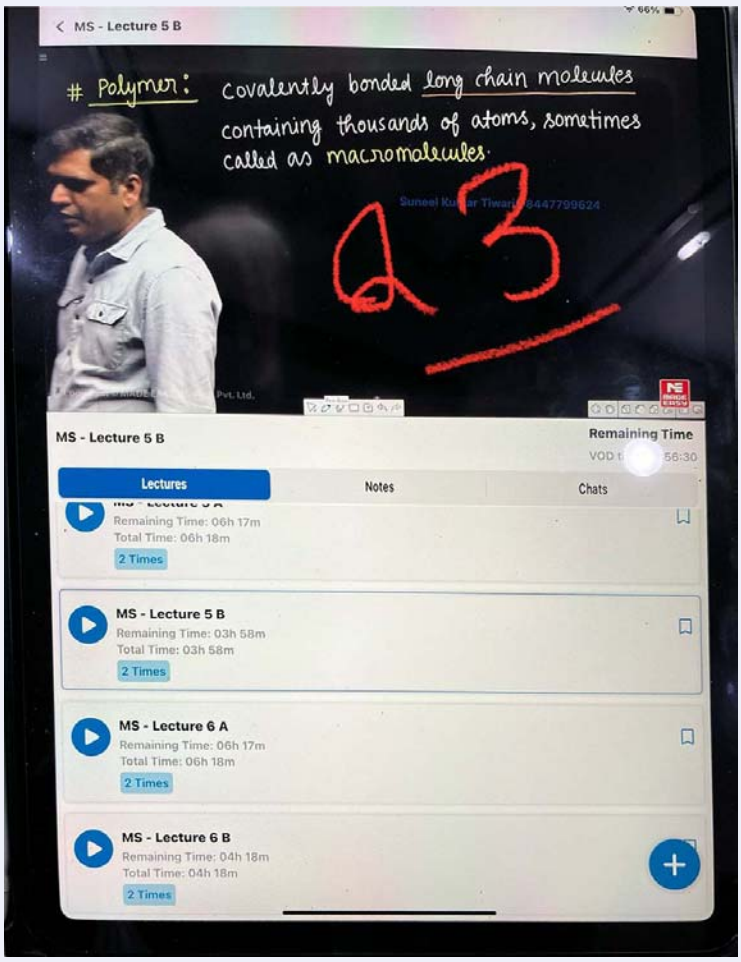
End of Solution

3. The long chain molecules are randomly oriented in
(a) Plastic (b) Metal
(c) Diamond (d) Coal

Ans. (a)

The long chain molecules are randomly oriented polymers i.e. plastic.



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End of Solution

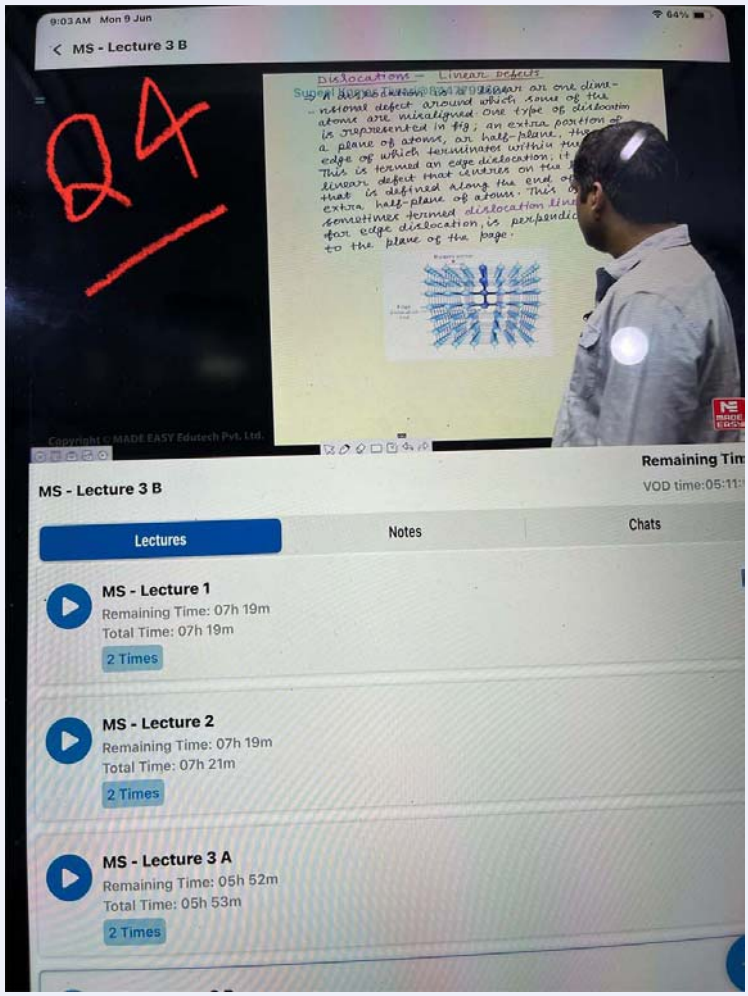
4. In which one of the following dislocations, an extra portion of a plane of atoms or half plane, the edge of which terminates within the crystal?

(a) Screw dislocation (b) Edge dislocation

(c) Mixed dislocation (d) Burgers dislocation

Ans. (b)

A dislocation is a linear or one-dimensional defect around which some of the atoms are misaligned. In one type of dislocation, an extra portion of a plane of atoms, or half-plane, the edge of which terminates within the crystal. This is termed an **edge dislocation**; it is a linear defect that centers around the line that is defined along the end of the extra half-plane of atoms. This is sometimes termed the dislocation line, which, for the edge dislocation is perpendicular to the plane of the page.



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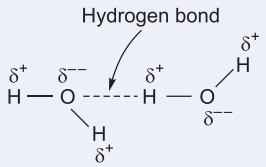
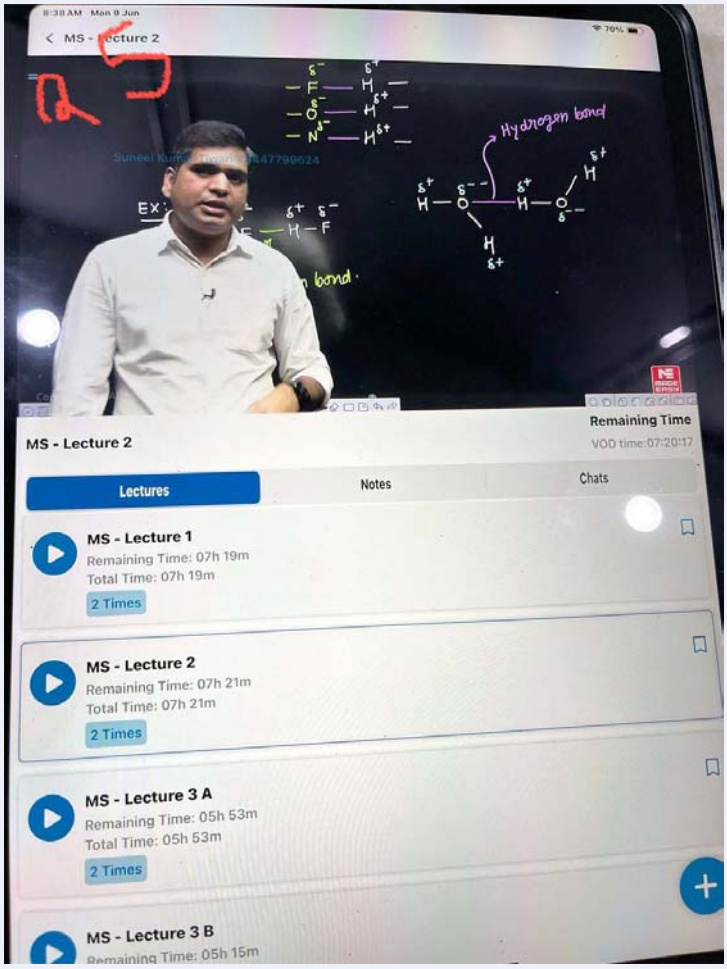
End of Solution

5. The bond that is formed between water molecules due to attraction between the positively-charged hydrogen end of a molecule and the negatively-charged oxygen end of another molecule is called

(a) Hydrogen bond
(b) Covalent bond
(c) Ionic bond
(d) Metallic bond

Ans. (a)





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End of Solution

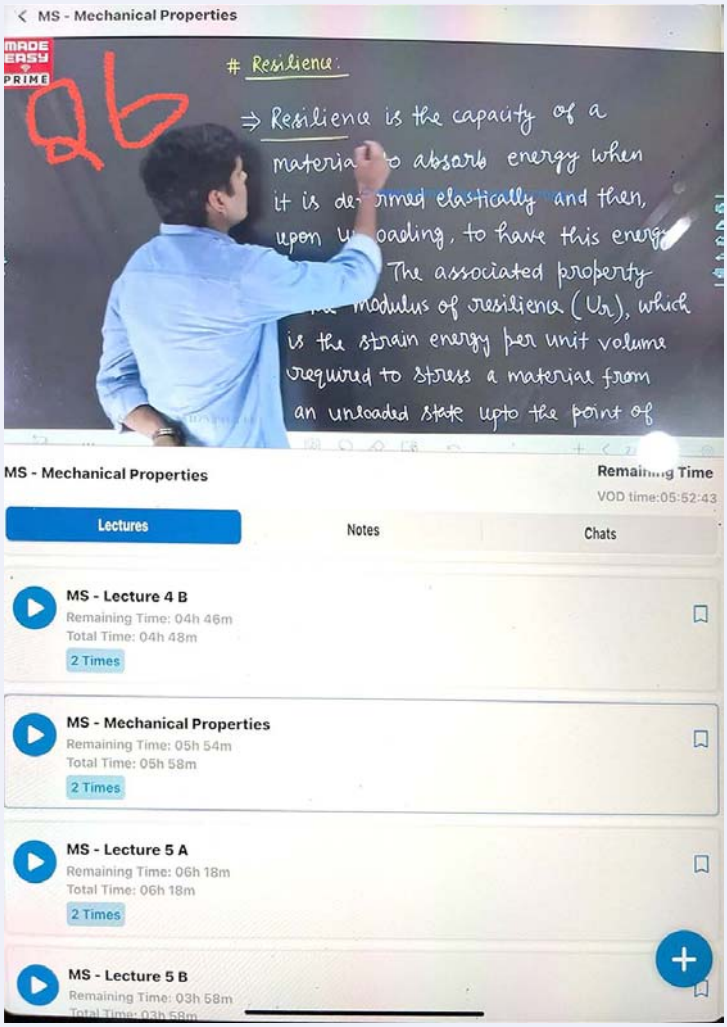
6. The capacity of a material to absorb energy when it is deformed elastically and then, upon unloading, to have this energy recovered is called

(a) Toughness (b) Resilience

(c) Modulus of elasticity (d) Yielding

Ans. (b)

Resilience is the capacity of a material to absorb energy when it is deformed elastically and then, upon unloading, to have this energy recovered.



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End of Solution

7. A specimen of steel having an original diameter of 12.8 mm is tensile tested to fracture and found to have engineering fracture strength σ_f of 460 MPa. If its cross sectional diameter at fracture is 10.7 mm, the ductility in terms of percent reduction in area will be

(a) 25% (b) 30%

(c) 35% (d) 40%

Ans. (b)

The ductility in terms of percent reduction is

$$\%RA = \left(\frac{A_0 - A_f}{A_0}\right) \times 100$$

$$= \frac{\pi\frac{d_0^2}{4} - \pi\frac{d_f^2}{4}}{\pi\frac{d_0^2}{4}} \times 100 = \frac{d_0^2 - d_f^2}{d_0^2} \times 100$$

$$= \frac{(12.8)^2 - (10.7)^2}{(12.8)^2} \times 100 \simeq 30\%$$

d_0 — original diameter
d_f — diameter at fracture

End of Solution

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8. External companies are enabled to view some of a particular company's information and such sharing of information is known as

(a) Ethernet (b) Internet

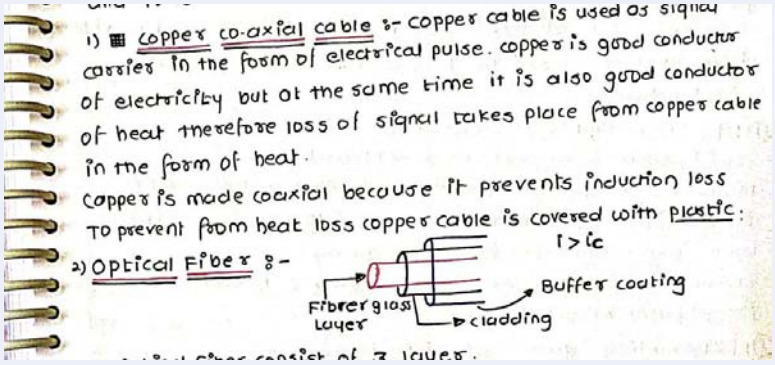
(c) Extranet (d) Fibrenet

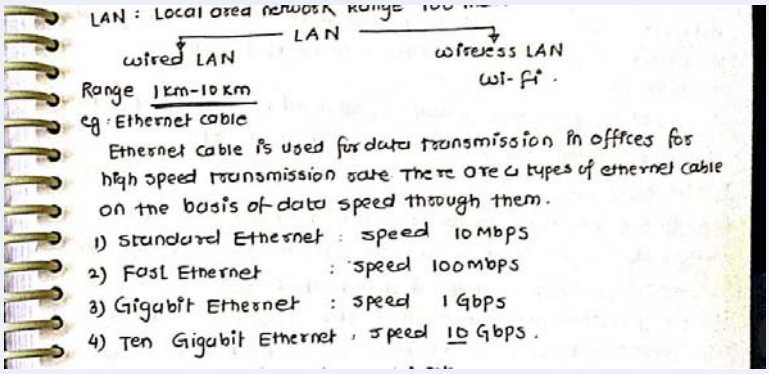
Ans. (c)

An Extranet is a private network that allows access to partners, vendors and suppliers or an authorized set of users outside the company. It helps facilitate secure sharing of part of a business's information or operations with external entities.

While Ethernet is a LAN networking technology, Fibernet is fibre based (e.g. Optical fibre) based internet service.

Internet is a global public network.





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End of Solution

9. A system or group of systems that enforces an access control policy between a trusted network and an untrusted network is called
(a) Perimeter access control
(b) Intrusion monitoring
(c) Interfacing the hardware components
(d) Managing the network privately

Ans. (a)

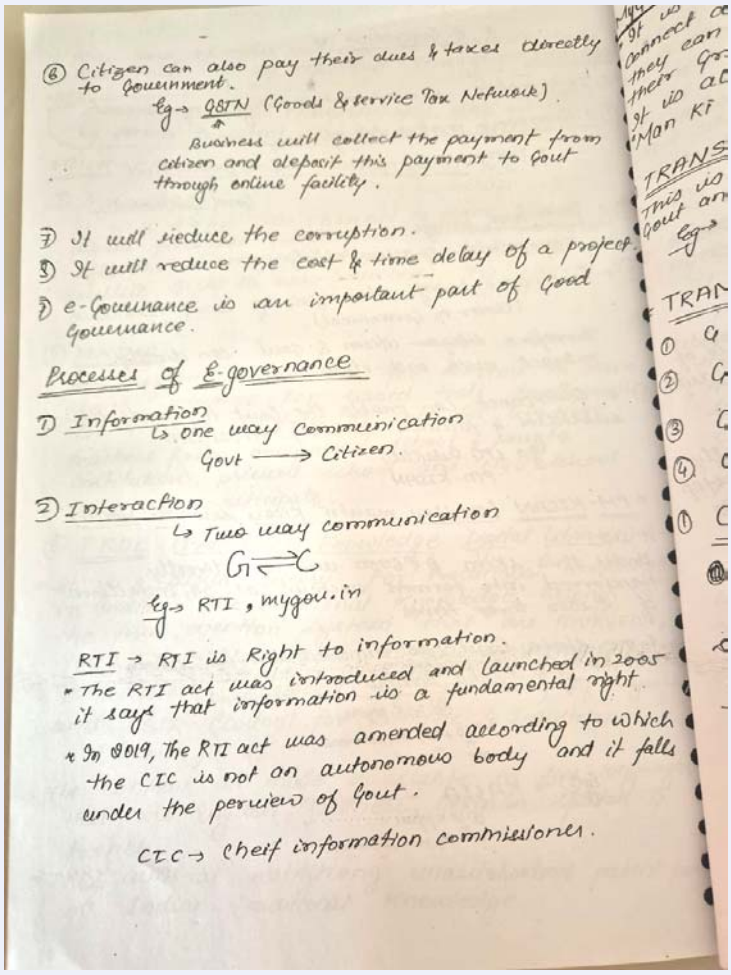
It refers to systems like firewalls that regulate traffic between a trusted network and an untrusted network. These systems enforce access control policies at the network boundary.

Intrusion monitoring means detecting unauthorized activity. It is not about controlling access.

End of Solution

10. Which one of the following is the correct sequence of e-Governance evolution model?
(a) Information, Transaction, Transformation and Interaction
(b) Information, Transaction, Interaction and Transformation
(c) Information, Transformation, Transaction and Interaction
(d) Information, Interaction, Transaction and Transformation

Ans. (d)



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End of Solution

11. Which one of the following phases is predominantly a testing and final standardization effort so that operations can begin in project management?
(a) Conceptual phase
(b) Production phase
(c) Operational phase
(d) Evaluation phase

Ans. (d)

End of Solution

12. Which one of the following float of an activity is the spare time available for that activity, if that activity is started as late as possible and is finished as early as possible?
(a) Total float
(b) Independent float
(c) Free float
(d) Slack

Ans. (b)

End of Solution

13. If the nominal rate of interest is 12% and is compounded quarterly, the effective rate of interest will be
(a) 10.6% per annum
(b) 12.6% per annum
(c) 14.4% per annum
(d) 16.4% per annum

Ans. (b)

End of Solution

14. Which one of the following approaches is available to estimate the rate of returns required by the equity shareholder?
(a) Dividend growth approach
(b) Dividend reinvestment approach
(c) Dividend capitalization approach
(d) Dividend pricing model approach

Ans. (a)

End of Solution

15. An assessment of comparative strength and weaknesses of a business firm in relation of competitions on one hand and the environmental opportunities and threats which a firm may be exposed to face is carried through
(a) Time-series analysis
(b) Cost-benefit analysis
(c) SWOT analysis
(d) Profit analysis

Ans. (c)

End of Solution

16. Which of the following is not considered as fundamental dimension of project plans?

(a) Time (b) Cost

(c) Scope (d) Quality

Ans. (d)

End of Solution

17. The shadow price of a unit of foreign exchange is

(a) $\sum_{i=1}^{n} F_i Q_i P_i$ (b) $\sum_{i=1}^{n} F_i + Q_i + P_i$

(c) $\sum_{i=1}^{n} F_i + Q_i - P_i$ (d) $\sum_{i=1}^{n} F_i - Q_i + P_i$

where:

P_i is domestic market clearing price of a commodity i.

Q_i is quantity of commodity i bought with one unit foreign exchange.

F_i is fraction of foreign exchange, at margin spent on importing commodity.

Ans. (a)

End of Solution

18. An Income Elasticity of Demand e_i is

(a) $\frac{Q_2 - Q_1}{I_2 - I_1} \times \frac{I_2 + I_1}{Q_2 + Q_1}$

(b) $\frac{Q_2 + Q_1}{I_2 - I_1} \times \frac{I_2 + I_1}{Q_2 + Q_1}$

(c) $\frac{Q_2 - Q_1}{I_2 + I_1} \times \frac{I_2 - I_1}{Q_2 + Q_1}$

(d) $\frac{Q_2 - Q_1}{I_2 + I_1} \times \frac{I_2 + I_1}{Q_2 + Q_1}$

where:

Q_1 is quantity demanded in the base year.

Q_2 is quantity demanded in the following year.

I_1 is income level in the base year.

I_2 is income level in the following year.

Ans. (a)

End of Solution

19. Consider the following data:
Atomic radius of copper = 1.278 Å,
A_W = 63.54, N_e = 4, $N_A = 6.023 \times 10^{23}$
The density of the copper will be nearly
(a) 9 gram/cm^3 (b) 7 gram/cm^3
(c) 5 gram/cm^3 (d) 3 gram/cm^3

Ans. **(a)**

Atomic radius of copper

$$R = 1.278 \text{ Å} = 1.278 \times 10^{-8} \text{ cm}$$

$A_w = 63.54$

N_e = 4 = Effective no. of atoms per unit cell

$N_A = 6.023 \times 10^{23}$

The density of copper

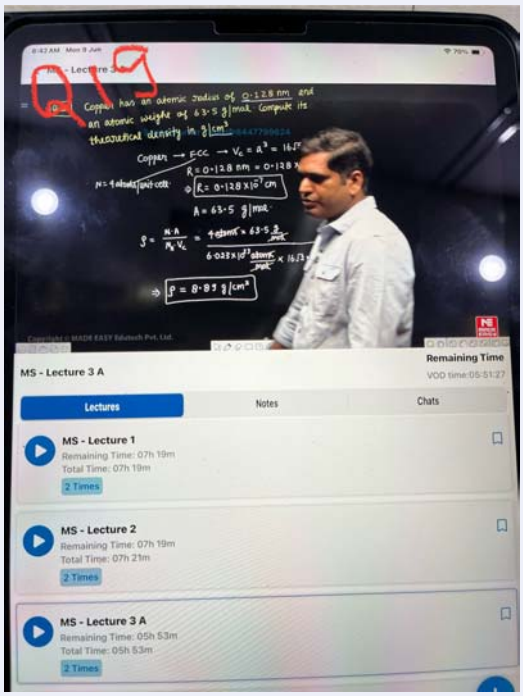
$$\rho = \frac{Ne\, A_w}{V_c\, N_A}$$

$$V_c = a^3 = \left(2\sqrt{2}R\right)^3$$

$$\Rightarrow \quad V_c = 16\sqrt{2}R^3$$

$$\Rightarrow \quad \rho = \frac{4 \times 63.54}{16\sqrt{2} \times \left(1.278 \times 10^{-8}\right)^3 \times 6.023 \times 10^{23}}$$

$$= 8.9 \text{ g/cm}^3 \simeq 9 \text{ gram/cm}^3$$



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End of Solution

20. The Knoop's Hardness Number (KHN) is

(a) $\frac{PC}{L^2}$ (b) $\frac{P}{L^2C}$

(c) $\frac{P+C}{L^2}$ (d) $\frac{P}{L^2-C}$

where:

L is the length of the long diagonal.

C is the constant related to the length of projected area for each indenter.

P is the applied load.

Ans. **(b)**

The projected area A is

$$A = C \cdot L^2$$

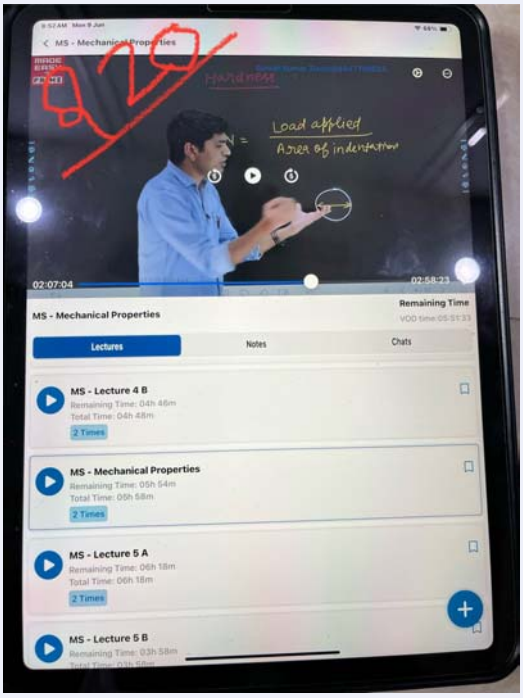
$$\therefore \quad \text{KHN} = \frac{P}{A} = \frac{P}{C.L^2}$$

For standard Knoop indenter,

$$C = 0.07028$$

$$\frac{1}{C} = 14.2$$

$$\therefore \quad \text{KHN} = \frac{14.2\,P}{L^2} = \frac{P}{0.07028\,L^2}$$



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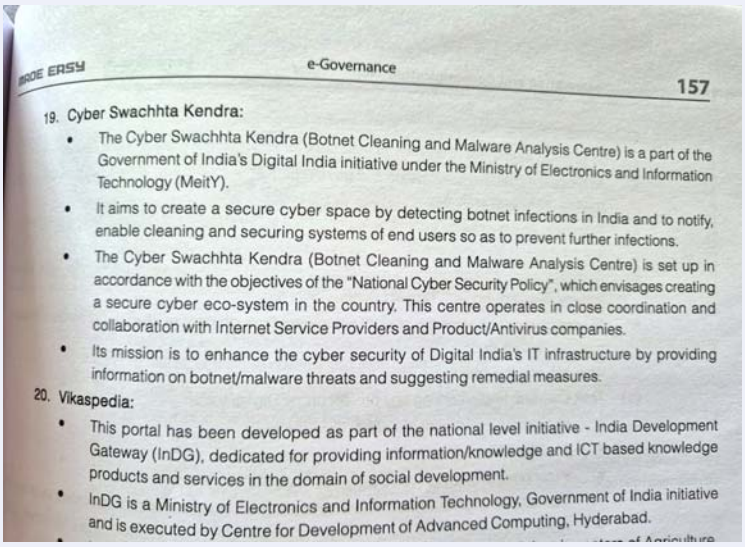
End of Solution

21. Which one of the following attack methods is originally developed as a rapid method to conduct many different IP-based DoS attacks?

(a) Nestea
(b) Packet storms
(c) Teardrop
(d) Targa

Ans. (d)

Targa is a well-known DoS attack tool designed to test system against multiple types of IP-based attacks. It supports various attack methods including malformed packets, that makes it suitable for launching many different kinds of IP-based DoS attacks.
Packet storm refers to traffic overload in general.
Teardrop and Nestea are specific attacks.



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19. Cyber Swachhta Kendra:
- The Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) is a part of the Government of India's Digital India initiative under the Ministry of Electronics and Information Technology (MeitY).
- It aims to create a secure cyber space by detecting botnet infections in India and to notify, enable cleaning and securing systems of end users so as to prevent further infections.
- The Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) is set up in accordance with the objectives of the "National Cyber Security Policy", which envisages creating a secure cyber eco-system in the country. This centre operates in close coordination and collaboration with Internet Service Providers and Product/Antivirus companies.
- Its mission is to enhance the cyber security of Digital India's IT infrastructure by providing information on botnet/malware threats and suggesting remedial measures.

20. Vikaspedia:
- This portal has been developed as part of the national level initiative - India Development Gateway (InDG), dedicated for providing information/knowledge and ICT based knowledge products and services in the domain of social development.
- InDG is a Ministry of Electronics and Information Technology, Government of India initiative and is executed by Centre for Development of Advanced Computing, Hyderabad.

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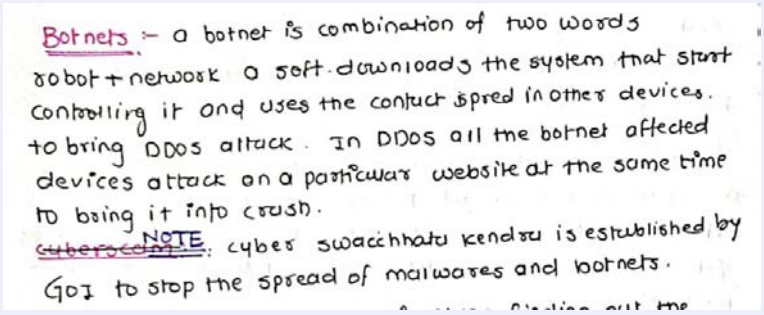

Botnets :- a botnet is combination of two words
ro bot + network o soft. downloads the system that start controlling it and uses the contact spred in other devices. to bring DDOS attack. In DDOS all the botnet affected devices attack on a particular website at the same time to bring it into crush.
NOTE: cyber swacchhata kendra is established by GoI to stop the spread of malwares and botnets.

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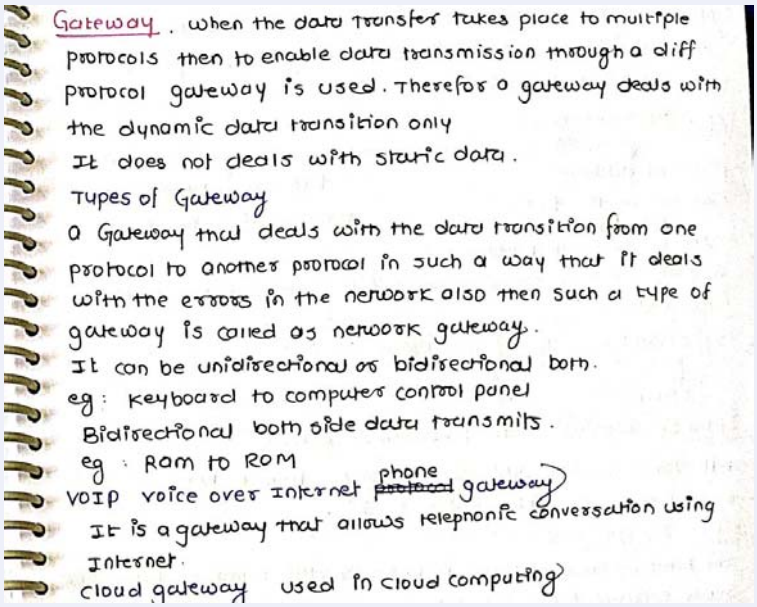
End of Solution

22. A special server-side programs that acts between the Hyper Text Transfer Protocol HTTP server and other local resources such as databases is

(a) HTML programs
(b) JavaScript programs
(c) Gateway programs
(d) High Level programs

Ans. (c)

Common Gateway Interface (CGI) or a server-side component acts as intermediary between the web server and backend services like databases. These are known as Gateway Programmes. HTML and JavaScript are not intermediate programmes.


Gateway . when the data transfer takes place to multiple protocols then to enable data transmission through a diff protocol gateway is used. Therefor a gateway deals with the dynamic data transition only
It does not deals with static data.
Types of Gateway
a Gateway that deals with the data transition from one protocol to another protocol in such a way that it deals with the errors in the network also then such a type of gateway is called as network gateway.
It can be unidirectional or bidirectional both.
eg: keyboard to computer control panel
Bidirectional both side data transmits.
eg : Ram to ROM
VOIP voice over Internet ~~protocol~~ phone gateway
It is a gateway that allows telephonic conversation using Internet.
Cloud gateway used in cloud computing

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End of Solution

23. Which of the following log files records failed logins in UNIX Operating System?

(a) Aculog
(b) Xferlog
(c) Loginlog
(d) Syslog

Ans. (c)

In UNIX, Loginlog is used to record failed login attempts.
Syslog is general-purpose logging system.
Xferlog is file transfer, in FTP.
Aculog is related to modem dial-out activities.

End of Solution

24. What is the time to perform search, insert, and delete operations in the average case as well as the worst case by using AVL tree?

(a) O(n)
(b) O(log n)
(c) $O(n^2)$
(d) O(n log n)

Ans. (b)

An AVL tree is a self-balancing binary search tree. It ensures that the height of the tree remains logarithmic in the number of nodes.

End of Solution

25. Which one of the following digital investigation models is based on the 'Zachman Framework' and was created to assist with the design, development and management of enterprise IT architecture?

(a) Physical model
(b) Staircase model
(c) FORZA model
(d) Sub-phase model

Ans. (c)

FORZA (Forensic Zachman) model is a digital forensic investigation framework that is based on Zachman Framework. It aids in managing the digital investigation process in alignment with entreprise IT architecture. It is designed to ensure a structured and comprehensive approach to investigations.

End of Solution

26. An equivocal forensic analysis is one in which the conclusions regarding the physical and digital evidence are

(a) End of interpretation
(b) Still open to interpretation
(c) Reconstruction of interpretation
(d) Reformation of interpretation

Ans. (b)

End of Solution

27. Cross-site scripting is a general set of techniques whereby an attacker is able to

(a) Send the mass e-mails to the recipients
(b) Host a website on an infected or malicious web server
(c) Execute a malicious code on another system through an intermediary web application
(d) Control on the web application through SQL control characters

Ans. (c)

Cross-site scripting enables attackers to inject and execute malicious scripts in the browser of users viewing the web page.

End of Solution

28. An idea, a design, a manuscript, an invention, or a concept which will give rise to a useful product/application, is known as
(a) Intellectual property right
(b) Employees right
(c) Professional right
(d) Recognition right

Ans. (a)

End of Solution

29. An engineering ethics is the study of
(a) Decisions, policies and values that are morally desirable in engineering practice and research
(b) Policies, time-management and values that are morally desirable in engineering practice and research
(c) Decisions, time-management and values that are morally desirable in engineering practice and research
(d) Policies, human resource management and values that are morally desirable in engineering practice and research

Ans. (a)

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End of Solution

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30. Manufacturing, selling or transporting products (liquor and narcotics) that are prohibited by law, is called

(a) Industrial espionage
(b) White-collared crimes
(c) Bootlegging
(d) Glitching

Ans. (c)

End of Solution

31. Microorganisms which can produce organic matter to some extent through oxidation of certain chemicals in the absence of sunlight are known as

(a) Photo-autotrophs
(b) Chemo-autotrophs
(c) Micro-autotrophs
(d) Oxi-autotrophs

Ans. (b)

End of Solution

32. The downstream concentration CI in a mathematical model of simple water quality mixing with respect to EIA methodologies is

(a) $\frac{Q_oC_o + Q_eC_e}{Q_o + Q_e}$
(b) $\frac{Q_oC_o - Q_eC_e}{Q_o + Q_e}$
(c) $\frac{Q_oC_o + Q_eC_e}{Q_o - Q_e}$
(d) $\frac{Q_oC_o - Q_eC_e}{Q_o - Q_e}$

where:
Q_e is the effluent flow
Q_o is the upstream flow
C_e is the effluent concentration
C_o is the upstream concentration

Ans. (a)

End of Solution

33. The available wind power P_a in an aero-turbine is

(a) $\frac{1}{8}\rho\pi D^2V^3$
(b) $\frac{3}{8}\rho\pi D^3V^2$
(c) $\frac{1}{8}\rho\pi D^3V^2$
(d) $\frac{3}{8}\rho\pi D^2V^3$

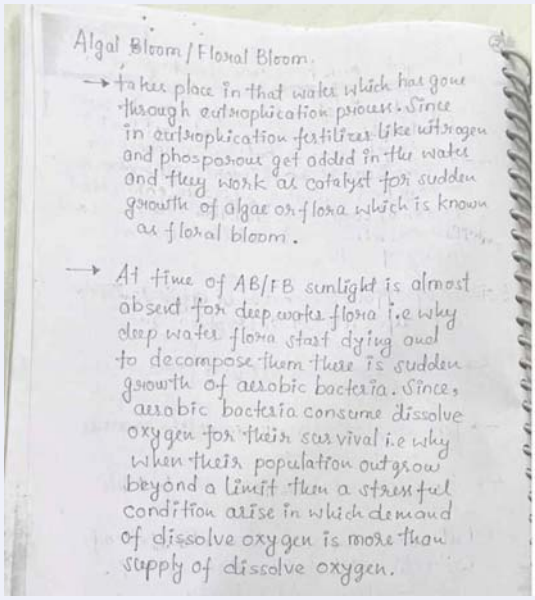
where:
V is the velocity of air
D is the diameter of circular flow
ρ is the density of air

Ans. (a)

End of Solution

34. 'Algal Bloom' is, when unusually large concentrations of
(a) Nutrients are present in water bodies; an excess growth of algae appears
(b) Planktons are present in water bodies; an excess growth of algae appears
(c) Bacteria are present in water bodies; an excess growth of algae appears
(d) Oxygen is present in water bodies; an excess growth of algae appears

Ans. (a)



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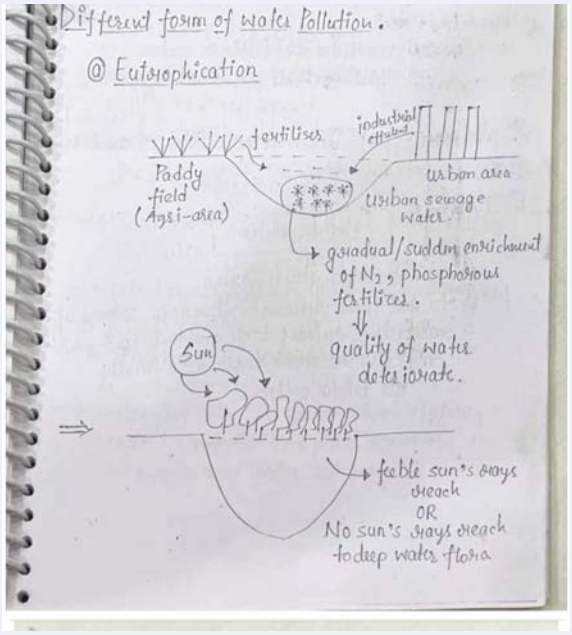

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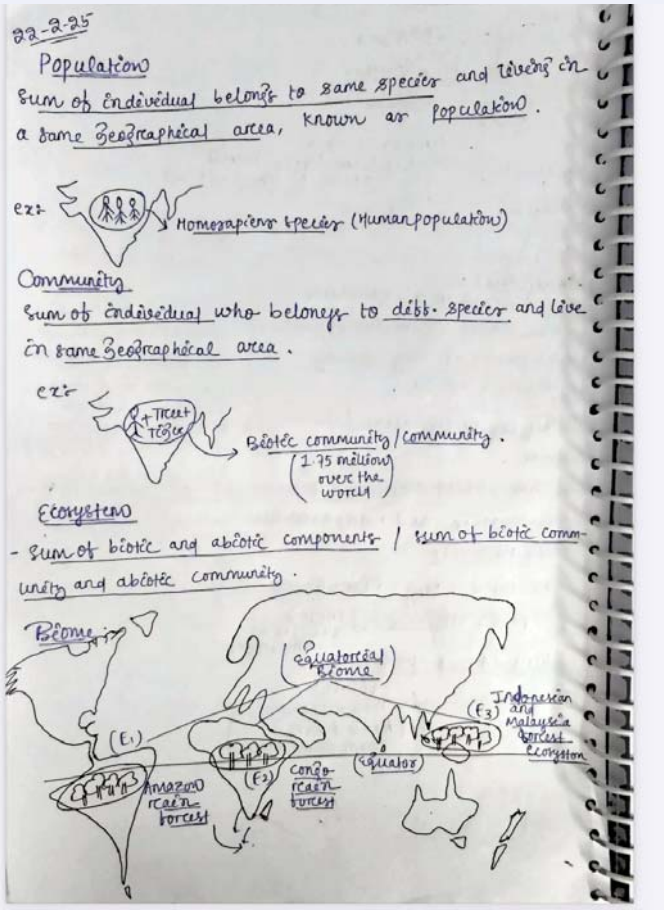
End of Solution

35. The correct sequence of the components of biological diversity or biodiversity in the hierarchy of ecosystem is

(a) Landscape, Population, Species, Community and Gene
(b) Community, Landscape, Population, Species and Gene
(c) Landscape, Community, Population, Species and Gene
(d) Community, Population, Landscape, Species and Gene

Ans. (c)



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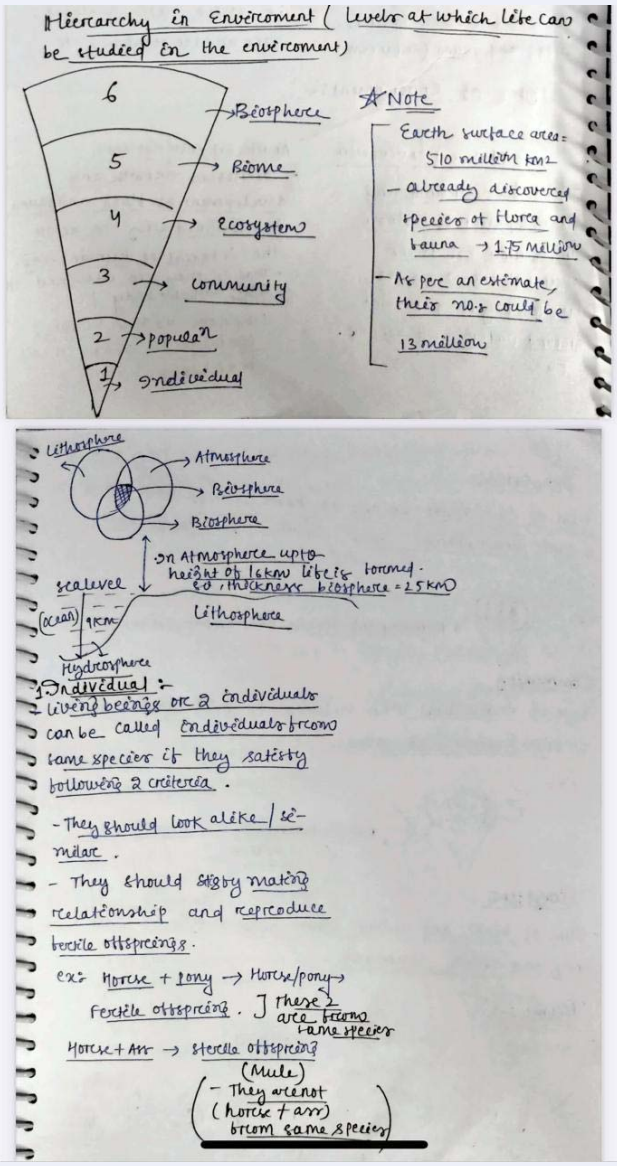

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End of Solution

36. The geometrical shape or form of the smoke coming out of a chimney is called

(a) Fume (b) Fog

(c) Plume (d) Smog

Ans. (c)

End of Solution

37. A situation when there is a prolonged period of inadequate rain fall, marked with erratic distribution of the same over time and space, is called

(a) Agricultural drought
(b) Ecological drought
(c) Hydrological drought
(d) Meteorological drought

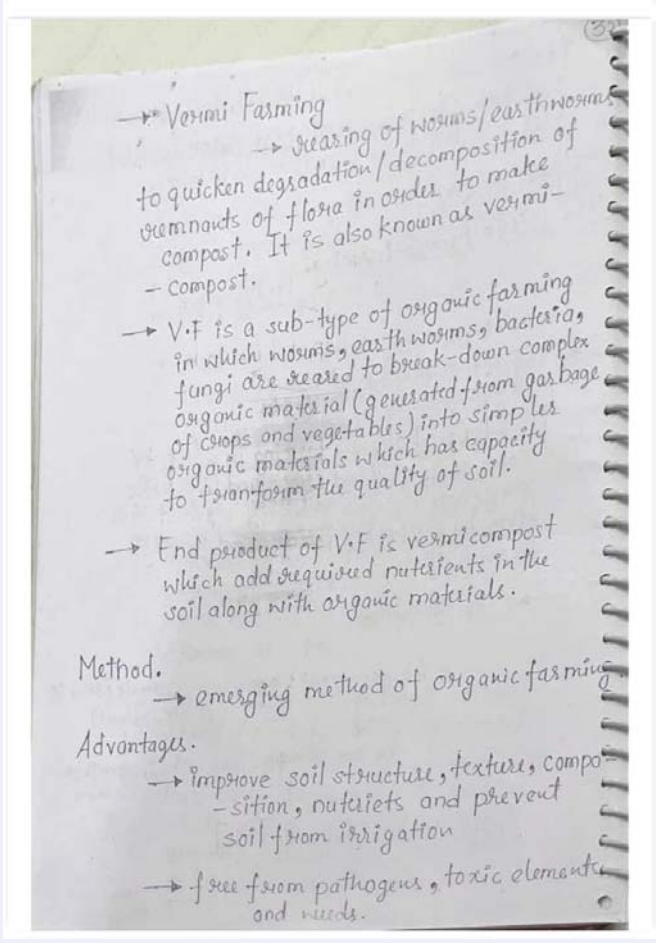
Ans. (d)

End of Solution

38. The process of converting the solid wastes-sewage sludge, domestic and agricultural wastes into compost manure is called

(a) Sericulture
(b) Ployculture
(c) Bio-digester
(d) Vermiculture

Ans. (d)



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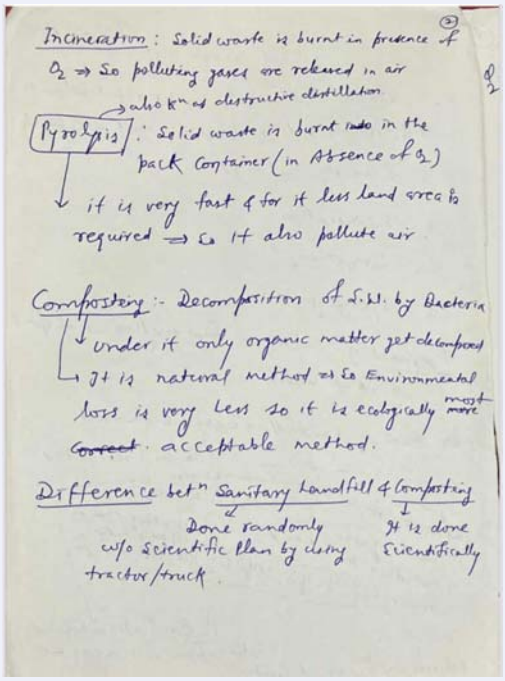

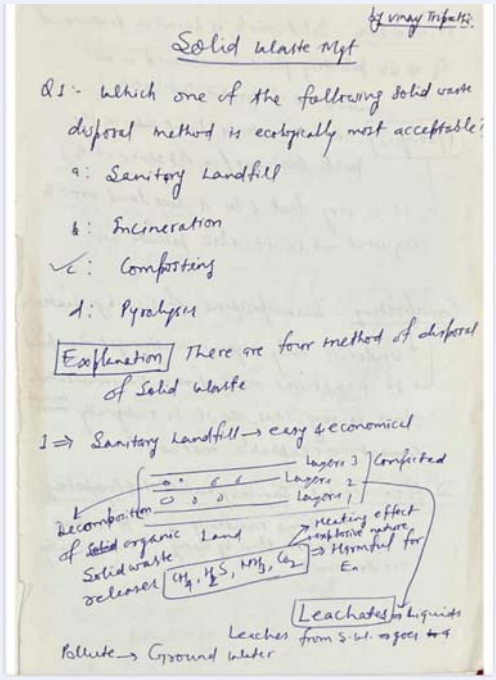

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End of Solution

39. A mass movement in which material moves along a curved surface of rupture (slow or moderately rapid movement of a coherent body of rock) is called

(a) Soil creep (b) Slump
(c) Rockslide (d) Earth creep

Ans. (b)

End of Solution

40. A layout which is designed in such a way that the entire process of receiving raw materials, processing and the outward movement of the finished goods takes place smoothly and efficiently is called

(a) Transport layout (b) Organizational layout
(c) General functional layout (d) Utilities layout

Ans. (a)

End of Solution

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41. Moral statements are merely used to express emotions and to try to influence other people's behaviour but they are not supportable by valid moral reasons. This is termed as

(a) Nihilism
(b) Compatibilism
(c) Emotivism
(d) Eudaimonia

Ans. (c)

End of Solution

42. In order to ensure the confluence of good engineering, good business, and good ethics, it is essential for engineering and corporations, in their major dimensions, to be

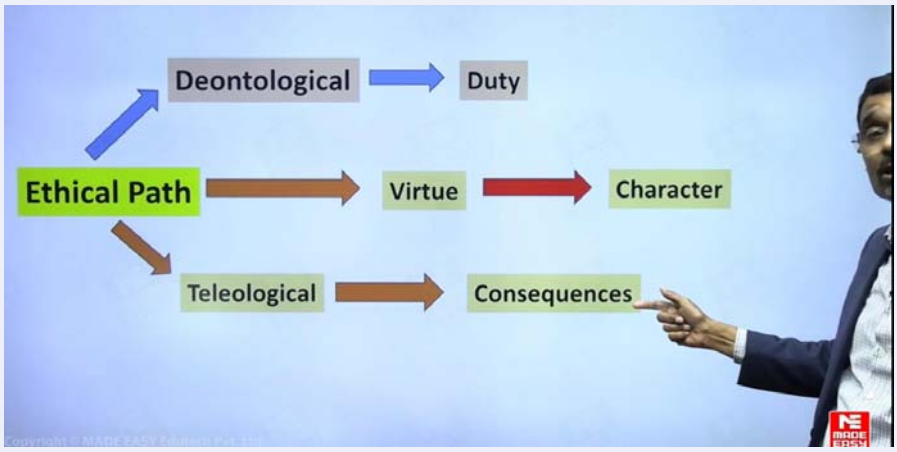
(a) Socially aligned
(b) Spiritually aligned
(c) Morally aligned
(d) Conscientiously aligned

Ans. (d)

End of Solution

43. What is Teleological Approach?
(a) Developing an individual personnel characteristics
(b) We can know what is good only when we have fully understood the context
(c) Judging whether an action is right, fair and honest
(d) Placing posters about ethics throughout the organization

Ans. (b)



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End of Solution

44. Self-respect, family happiness, comfortable life, professional growth and recognition are
(a) Terminal values
(b) Instrumental values
(c) Mainstream values
(d) Human values

Ans. (a)

End of Solution

45. Yawning, sneezing, relaxing the body by bending backwards, snoring, spitting, such habits are to be avoided in front of others in a gathering. A person who is conscious of above habits is said to have
(a) Ethics
(b) Values
(c) Integrity
(d) Civic sense

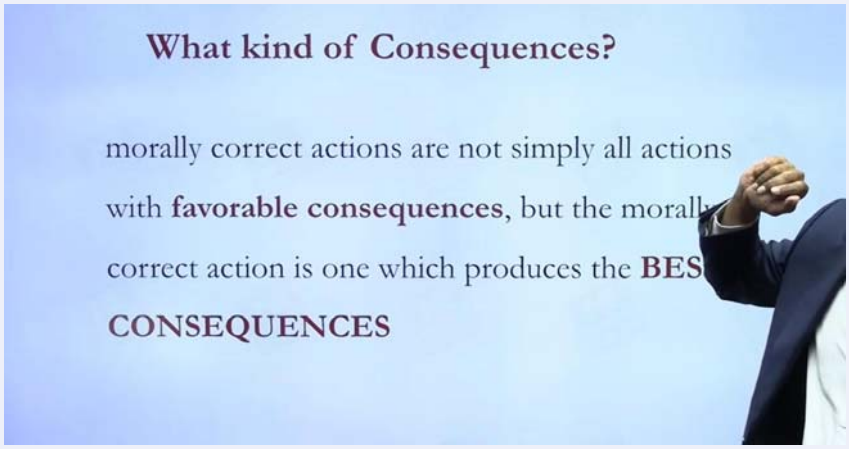
Ans. (d)

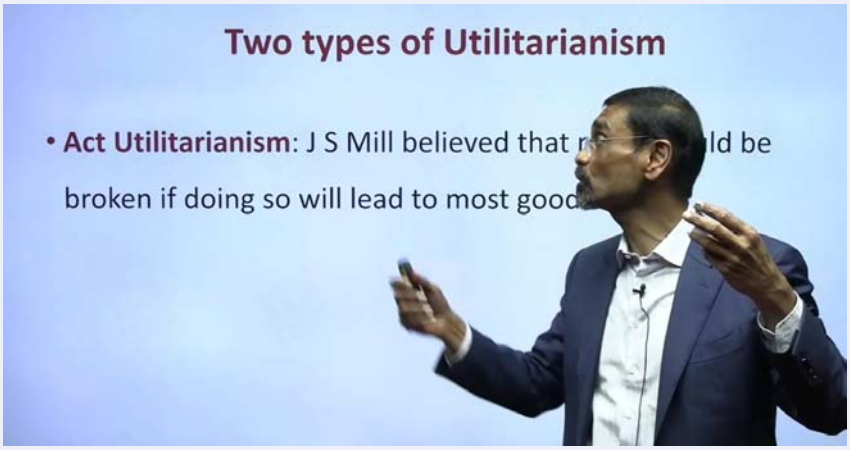
End of Solution

46. A balance between good and bad consequences of an action, taking into account the consequences for everyone affected is known as

(a) Virtue ethics
(b) Utilitarianism
(c) Duty ethics
(d) Right ethics

Ans. (b)





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End of Solution

47. Ethics that guides human conduct and sets out certain moral standard is called
(a) Metaethics (b) Applied ethics
(c) Normative ethics (d) Legal ethics

Ans. (c)

End of Solution

Directions: Each of the next Three (03) items consists of two statements, one labelled as the 'Statement (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 Statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I)
(b) Both Statement (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

48. Statement (I): Explicit indicator is the methodology that should suggest specific and measurable indicators to be used to qualify impacts on the relevant environmental parameters.

Statement (II): Magnitude is the methodology that should provide for the measurement of impact magnitude.

Ans. (b)

End of Solution

49. Statement (I): A country which doubles its capital in ten years will have a higher output per unit of capital than a country which doubles it in twenty years.
Statement (II): New investment and new technology go together.

Ans. (a)

Higher output per unit of capital, in economics terms refers to more output being produced with the same amount of capital investment.
Statement (I) refers to higher output comparison and statement (II) refers to how higher output can be achieved through new investment that brings new technology and hence higher output of capital.

End of Solution

50. Statement (I): An evaluation and identification of sources, types and qualities of pollutants generated by different phases of project activity.

Statement (II): In activity step model for environmental impact assessment studies, the detailed evaluation of existing ambient air quality, meteorological conditions and nuclear air quality existing in the project area.

Ans. (b)

End of Solution

51. Which one of the following is the advantage of an 'equity capital'?
(a) Dividends paid by a company are not tax deductible
(b) Equity holders expect greater return as they undertake more risk
(c) Equity shares are not repayable to the shareholders as these are nonrefundable
(d) Issue of equity shares also result in dilution of control of the company

Ans. (c)

Equity Capital is received from equity shares. Equity means equal share in profit or loss of the company. Hence, when equity capital is received by giving equity share it is non-refundable, non-repayable to the shareholder.

End of Solution

52. Which one of the following branch of economics is focusing on improving fiscal, economic and social conditions in developing (low income) countries?
(a) Social economics
(b) Fiscal economics
(c) Development economics
(d) Micro economics

Ans. (c)

Development Economics is the branch of economics that studies how economies in low and middle income countries can achieve economic growth, improve living standards and address challenges like poverty and inequality.

End of Solution

53. Which one of the following is correct with respect to the Industrial Relations Bill?
(a) Workers can raise objection to retrenchment within five years
(b) Government consent required for workers to move courts in case conciliation fails
(c) Trade union deemed registered if application not processed within six months by government
(d) Labour court, board of arbitration and tribunal court won't exist; only industrial tribunal to continue

Ans. (d)

Industrial Code, 2020 abolishes existing institutions like the Labour Court, Industrial Tribunal and Arbitration Boards and replaces them with a single Industrial Tribunal. This is aimed at speeding up dispute resolution and reducing multiplicity of forums.

End of Solution

54. What is PPP in sustainable agricultural sector?
(a) Public Product Percentage
(b) Present Product Partnership
(c) Public Private Partnership
(d) Present Private Percentage

Ans. (c)
PPP: Public Private Partnership.

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REPORTS & INDICES

Report on S.A.F.E. Accommodation

NITI Aayog released a report on "S.A.F.E. Accommodation – Worker Housing for manufacturing growth".

Key Highlights

- The report explores the crucial role of secure, affordable, flexible, and efficient (S.A.F.E.) accommodations for industrial workers in boosting India's manufacturing sector.
- It identifies key challenges, offers actionable solutions, and highlights the pivotal interventions required to scale up such housing facilities across the country.
- In the Union Budget 2024-25, the Union Finance Minister emphasized the importance of rental housing for industrial workers. This initiative, to be executed under a Public-Private Partnership (PPP) model with Viability Gap Funding (VGF).
- India is poised to elevate its manufacturing sector's contribution to GDP from the current 17% to 25% as part of achieving Viksit Bharat by 2047.
- Key states like Maharashtra, Karnataka, and Delhi are emerging as talent hubs, with cities such as Pune, Bengaluru, and Mumbai providing a skilled workforce.
- The men's employability is expected to rise to 53.5% in 2025 from 51.8% in 2024, while women's employability is projected to decline from 50.9% to 47.5%.

Women and Men in India 2024 Report

The Ministry of Statistics and Programme Implementation (MoSPI), released the 26th edition of its publication titled "Women and Men in India 2024: Selected Indicators and Data".

Key Highlights

- The publication offers a comprehensive overview of the gender landscape in India, presenting selected indicators and data across key areas like population, education, health, economic participation, and decision-making, all sourced from various Ministries/ Departments/Organizations.
- **Education:** The Gender Parity Index (GPI) for enrolments at

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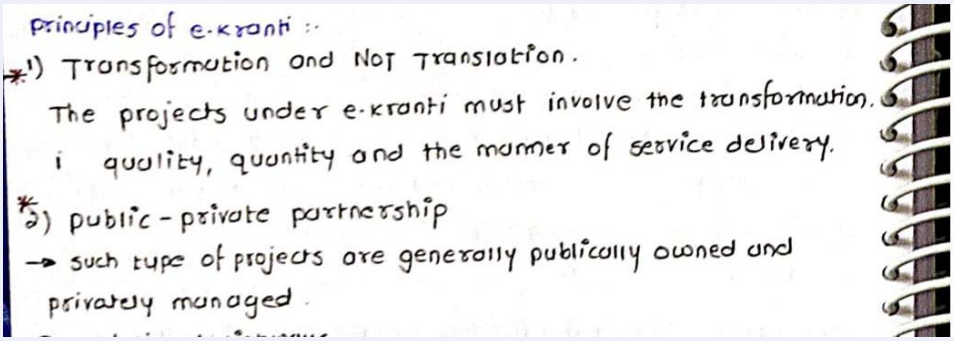

Principles of e-kranti :-

*1) Transformation and Not Translation.

The projects under e-kranti must involve the transformation, i quality, quantity and the manner of service delivery.

*2) public-private partnership

→ such type of projects are generally publically owned and privately managed.

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End of Solution

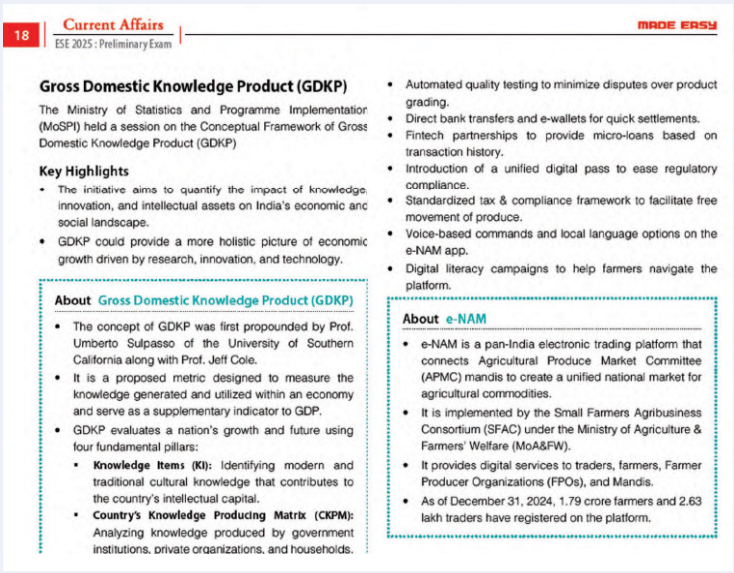
55. Which one of the following is an effort to get to the next stage of creating a pan-India electronic portal, which networks the existing APMC mandis by creating a national market for agricultural commodities?

(a) National APMC Market
(b) National Agricultural Market
(c) National Network Portal
(d) National Electronic Portal

Ans. (b)

National Agricultural Market: It is an online mandi where all existing APMC (Agricultural Produce Marketing Committee) are networked online. Farmers and Buyers can register themselves. Buyers can buy the produce through online auctions.

Hence, National Agricultural Market is a national market for agricultural commodities.



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Gross Domestic Knowledge Product (GDKP)

The Ministry of Statistics and Programme Implementation (MoSPI) held a session on the Conceptual Framework of Gross Domestic Knowledge Product (GDKP)

Key Highlights

- The initiative aims to quantify the impact of knowledge, innovation, and intellectual assets on India's economic and social landscape.
- GDKP could provide a more holistic picture of economic growth driven by research, innovation, and technology.

About Gross Domestic Knowledge Product (GDKP)

- The concept of GDKP was first propounded by Prof. Umberto Sulpasso of the University of Southern California along with Prof. Jeff Cole.
- It is a proposed metric designed to measure the knowledge generated and utilized within an economy and serve as a supplementary indicator to GDP.
- GDKP evaluates a nation's growth and future using four fundamental pillars:
  - **Knowledge Items (KI):** Identifying modern and traditional cultural knowledge that contributes to the country's intellectual capital.
  - **Country's Knowledge Producing Matrix (CKPM):** Analyzing knowledge produced by government institutions, private organizations, and households.

- Automated quality testing to minimize disputes over product grading.
- Direct bank transfers and e-wallets for quick settlements.
- Fintech partnerships to provide micro-loans based on transaction history.
- Introduction of a unified digital pass to ease regulatory compliance.
- Standardized tax & compliance framework to facilitate free movement of produce.
- Voice-based commands and local language options on the e-NAM app.
- Digital literacy campaigns to help farmers navigate the platform.

About e-NAM

- e-NAM is a pan-India electronic trading platform that connects Agricultural Produce Market Committee (APMC) mandis to create a unified national market for agricultural commodities.
- It is implemented by the Small Farmers Agribusiness Consortium (SFAC) under the Ministry of Agriculture & Farmers' Welfare (MoA&FW).
- It provides digital services to traders, farmers, Farmer Producer Organizations (FPOs), and Mandis.
- As of December 31, 2024, 1.79 crore farmers and 2.63 lakh traders have registered on the platform.

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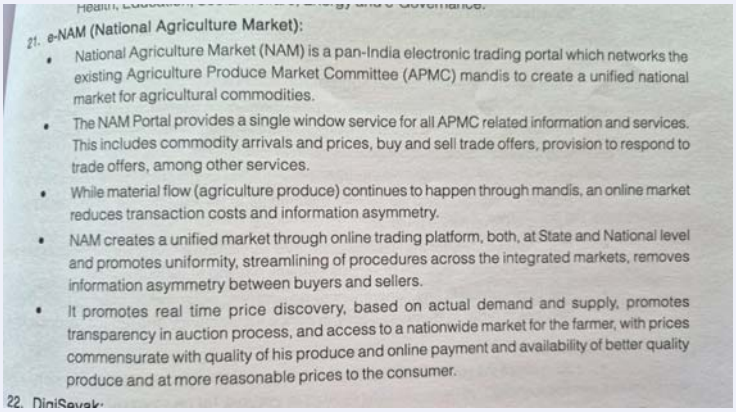

21. e-NAM (National Agriculture Market):

- National Agriculture Market (NAM) is a pan-India electronic trading portal which networks the existing Agriculture Produce Market Committee (APMC) mandis to create a unified national market for agricultural commodities.
- The NAM Portal provides a single window service for all APMC related information and services. This includes commodity arrivals and prices, buy and sell trade offers, provision to respond to trade offers, among other services.
- While material flow (agriculture produce) continues to happen through mandis, an online market reduces transaction costs and information asymmetry.
- NAM creates a unified market through online trading platform, both, at State and National level and promotes uniformity, streamlining of procedures across the integrated markets, removes information asymmetry between buyers and sellers.
- It promotes real time price discovery, based on actual demand and supply, promotes transparency in auction process, and access to a nationwide market for the farmer, with prices commensurate with quality of his produce and online payment and availability of better quality produce and at more reasonable prices to the consumer.

22. DigiSevak:

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End of Solution

56. Which one of the following Yojanas replaces two schemes - National Agricultural Insurance Scheme (NAIS), 1999 as well as the Modified National Agricultural Insurance Scheme (MNAIS), 2010 - by incorporating the best features of all these schemes while removing the previous shortcomings and weaknesses?
(a) Pradhan Mantri Krishi Sinchayee Yojana
(b) Pradhan Mantri Fasal Sinchayee Yojana
(c) Pradhan Mantri Krishi Bharat Yojana
(d) Pradhan Mantri Fasal Bima Yojana

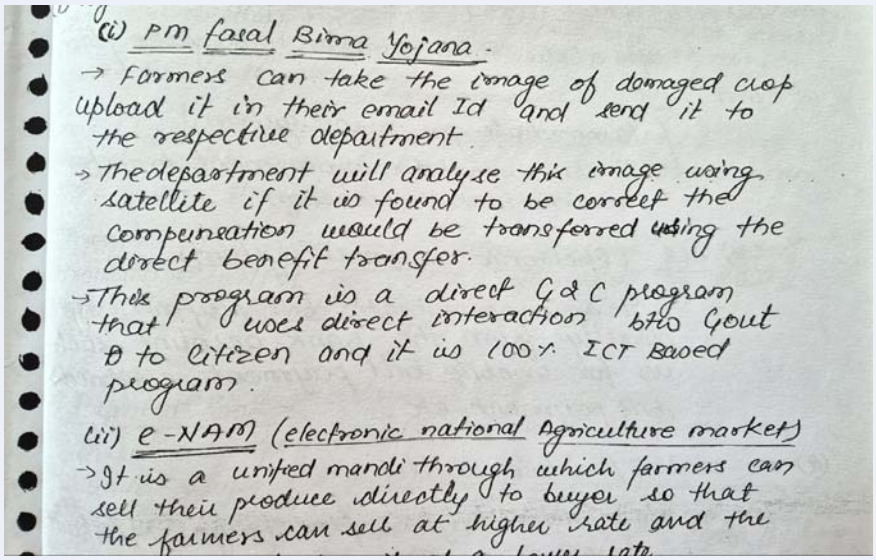
Ans. (d)

Pradhan Mantri Fasal Bima Yojana is a crop insurance scheme completely based on ICT. It provides insurance of crops to farmers against natural hazards such as fire, pest attack, rain, hailstorm etc.

The programme is launched by replacing two schemes:

(i) National Agricultural Insurance Scheme (NAIS), 1999

(ii) Modified National Agricultural Insurance Scheme, 2010.


(i) PM fasal Bima Yojana.
→ Farmers can take the image of damaged crop upload it in their email Id and send it to the respective department.
→ The department will analyse this image using satellite if it is found to be correct the compensation would be transferred using the direct benefit transfer.
→ This program is a direct G2C program that uses direct interaction btw Govt & to citizen and it is 100% ICT Based program.
(ii) e-NAM (electronic national Agriculture market)
→ It is a unified mandi through which farmers can sell their produce directly to buyer so that the farmers can sell at higher rate and the

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End of Solution

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57. Which one of the following is NOT the principle of India's Foreign Policy for Panchsheel?
(a) Mutual non-interference in each other's affairs
(b) Mutual contentions
(c) Equality and mutual benefit
(d) Peaceful co-existence

Ans. (b)

Panchsheel Policy was developed in 1954 between India and China, to guide relations between the two countries.

Five principles of Panchsheel are:

1. Mutual respect for territorial integrity and sovereignty.
2. Non-Aggression
3. Non-Interference in Internal Affairs.
4. Equality and Mutual benefit.
5. Peaceful co-existance.

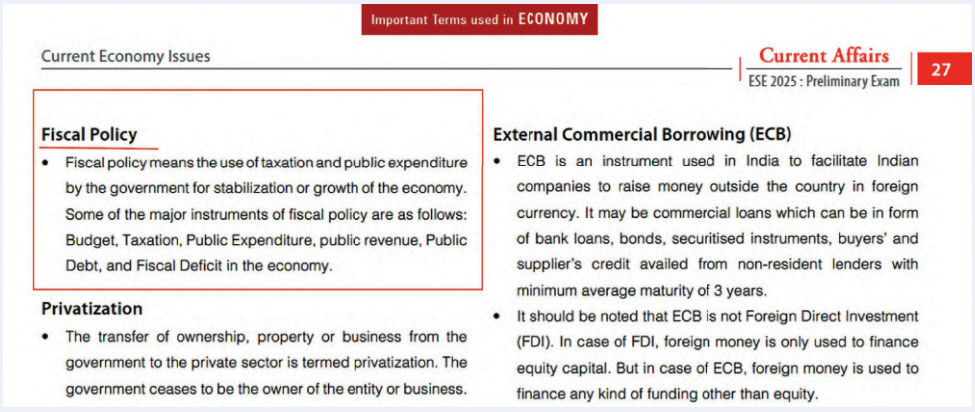
End of Solution

58. Government's strategy in respect of public expenditure and revenue can have significant impact on the business is called

(a) Monetary policy
(b) Fiscal policy
(c) Trade policy
(d) Industrial policy

Ans. (b)

To control money supply in the market, RBI applies Monetary Policy while, Govt. of India applies Fiscal Policy. Fiscal Policy includes taxation, expenditure, and revenue.



Important Terms used in ECONOMY

Current Economy Issues | Current Affairs ESE 2025 : Preliminary Exam | 27

Fiscal Policy

- Fiscal policy means the use of taxation and public expenditure by the government for stabilization or growth of the economy. Some of the major instruments of fiscal policy are as follows: Budget, Taxation, Public Expenditure, public revenue, Public Debt, and Fiscal Deficit in the economy.

Privatization

- The transfer of ownership, property or business from the government to the private sector is termed privatization. The government ceases to be the owner of the entity or business.

External Commercial Borrowing (ECB)

- ECB is an instrument used in India to facilitate Indian companies to raise money outside the country in foreign currency. It may be commercial loans which can be in form of bank loans, bonds, securitised instruments, buyers' and supplier's credit availed from non-resident lenders with minimum average maturity of 3 years.
- It should be noted that ECB is not Foreign Direct Investment (FDI). In case of FDI, foreign money is only used to finance equity capital. But in case of ECB, foreign money is used to finance any kind of funding other than equity.

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End of Solution

59. Which of the following arguments advanced in favour of labour-intensive techniques?

1. In underdeveloped countries there is an acute shortage of capital and entrepreneurial resources.
2. There is considerable saving in foreign exchange.
3. These techniques quickly increase the supply of consumable goods and obviate the danger of inflation.
4. More employment will be offered to the labour force in the long run.

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

Ans. (b)

A labour-intensive technique relies heavily on human labour to produce goods or services rather than relying on capital or machinery. It means more workers are used compared to the amount of capital or machinery.

In a labour intensive economy which is particularly an underdeveloped country there is acute shortage of resources, inflation is high since there is no uniformity of production and labour-intensive economy generates more employment in the long run.

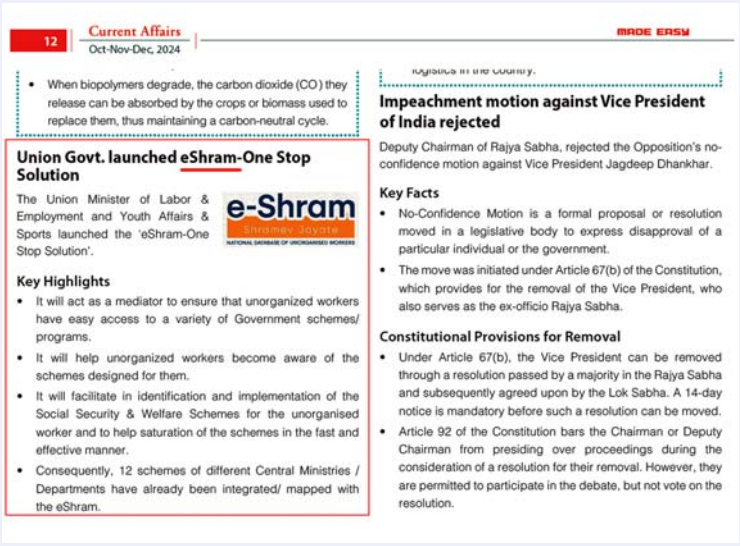
End of Solution

60. Which of the following features regarding 'Shram Suvidha Portal' are correct?
1. Unique labour identification number (LIN) will be allotted to units to facilitate online registration
2. Mandatory uploading of inspection reports within 72 hours by labour inspectors
3. Timely redressal of grievances will be ensured with the help of the portal

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

Ans. (c)

Launched in 2014, Shram Suvidha Portal aims to provide Unique Labour Identification Number (LIN) to facilitate online registration of labour force.
It also aims to bring Transparent Labour Inspection Scheme via computerized system as per risk-based criteria and uploading of inspection report within 48 hours.
Hence, it provides for timely redressal of grievances with the help of portal.



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- When biopolymers degrade, the carbon dioxide (CO) they release can be absorbed by the crops or biomass used to replace them, thus maintaining a carbon-neutral cycle.

Union Govt. launched eShram-One Stop Solution

The Union Minister of Labor & Employment and Youth Affairs & Sports launched the 'eShram-One Stop Solution'.

e-Shram Shramev Jayate

Key Highlights

- It will act as a mediator to ensure that unorganized workers have easy access to a variety of Government schemes/ programs.
- It will help unorganized workers become aware of the schemes designed for them.
- It will facilitate in identification and implementation of the Social Security & Welfare Schemes for the unorganised worker and to help saturation of the schemes in the fast and effective manner.
- Consequently, 12 schemes of different Central Ministries / Departments have already been integrated/ mapped with the eShram.

Impeachment motion against Vice President of India rejected

Deputy Chairman of Rajya Sabha, rejected the Opposition's no-confidence motion against Vice President Jagdeep Dhankhar.

Key Facts

- No-Confidence Motion is a formal proposal or resolution moved in a legislative body to express disapproval of a particular individual or the government.
- The move was initiated under Article 67(b) of the Constitution, which provides for the removal of the Vice President, who also serves as the ex-officio Rajya Sabha.

Constitutional Provisions for Removal

- Under Article 67(b), the Vice President can be removed through a resolution passed by a majority in the Rajya Sabha and subsequently agreed upon by the Lok Sabha. A 14-day notice is mandatory before such a resolution can be moved.
- Article 92 of the Constitution bars the Chairman or Deputy Chairman from presiding over proceedings during the consideration of a resolution for their removal. However, they are permitted to participate in the debate, but not vote on the resolution.

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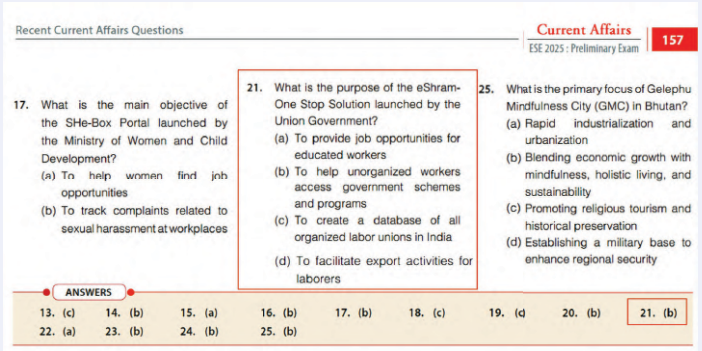

Recent Current Affairs Questions — Current Affairs ESE 2025 : Preliminary Exam 157

17. What is the main objective of the SHe-Box Portal launched by the Ministry of Women and Child Development?
(a) To help women find job opportunities
(b) To track complaints related to sexual harassment at workplaces

21. What is the purpose of the eShram-One Stop Solution launched by the Union Government?
(a) To provide job opportunities for educated workers
(b) To help unorganized workers access government schemes and programs
(c) To create a database of all organized labor unions in India
(d) To facilitate export activities for laborers

25. What is the primary focus of Gelephu Mindfulness City (GMC) in Bhutan?
(a) Rapid industrialization and urbanization
(b) Blending economic growth with mindfulness, holistic living, and sustainability
(c) Promoting religious tourism and historical preservation
(d) Establishing a military base to enhance regional security

ANSWERS
13. (c) 14. (b) 15. (a) 16. (b) 17. (b) 18. (c) 19. (c) 20. (b) 21. (b)
22. (a) 23. (b) 24. (b) 25. (b)

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End of Solution

61. In a triangle ABC, if the values of $a = 3$, $b = 4$ and $\sin A = \frac{3}{4}$, then the angle $\angle B$ will be

(a) 30° (b) 45°
(c) 60° (d) 90°

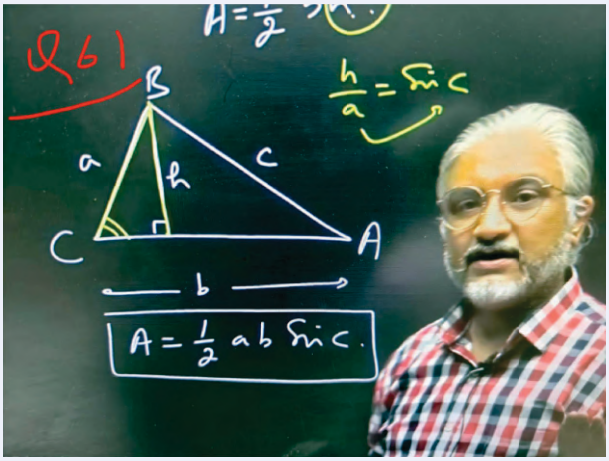
Ans. (d)

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{3}{\frac{3}{4}} = \frac{4}{\sin B}$$

$$\sin B = 1 = \sin 90°$$

$$B = 90°$$



MADE EASY Class Lecture

End of Solution

62. In an area of an ellipse, if one percent error is made in measuring the major and minor axis, the percentage error will be

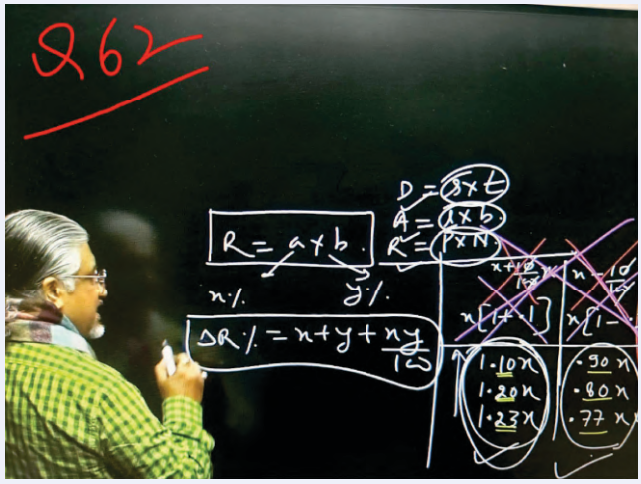
(a) 2% (b) 3%

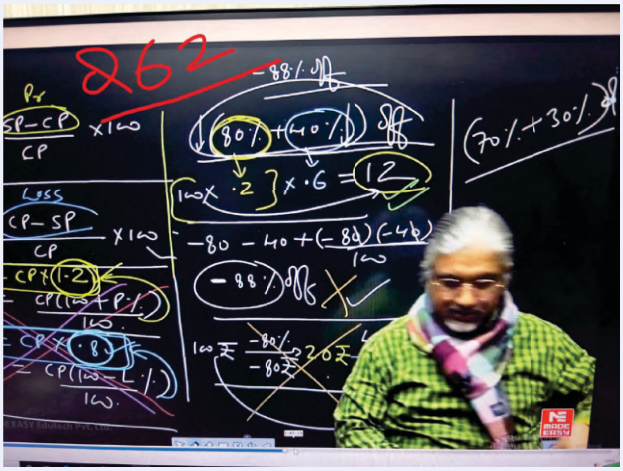
(c) 4% (d) 5%

Ans. (a)

$$A = \pi ab$$

approx 2%.





MADE EASY Class Lecture

End of Solution

63. Consider the following equation:

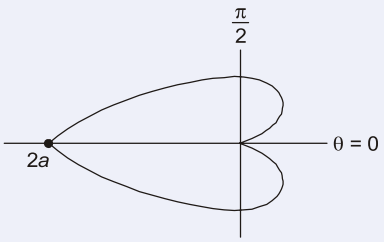
$$R = a(1 - \cos\theta)$$

The volume of the solid generated by the revolution of the cardioid about the initial line will be

(a) $\frac{3\pi a^2}{8}$ (b) $\frac{3\pi a^3}{8}$

(c) $\frac{8\pi a^2}{3}$ (d) $\frac{8\pi a^3}{3}$

Ans. (d)



Volume of solid of revolution of $r = a(1 - \cos\theta)$ about initial line $\theta = 0$ is given by

$$V = \int_0^{\pi} \frac{2\pi}{3} r^3 \sin\theta \, d\theta$$

$$= \int_0^{\pi} \frac{2\pi}{3} a^3 (1-\cos\theta)^3 \sin\theta \, d\theta$$

Let, $1 - \cos\theta = t$

$\cos\theta d\theta = dt$

$\theta = 0 \Rightarrow t = 0$

$\theta = \pi \Rightarrow t = 2$

$$= \int_{t=0}^{2} \frac{2\pi a^3}{3} t^3 \, dt$$

$$V = \frac{2\pi a^3}{3}\left(\frac{t^4}{4}\right)_0^2 = \frac{8\pi a^3}{3}$$

End of Solution

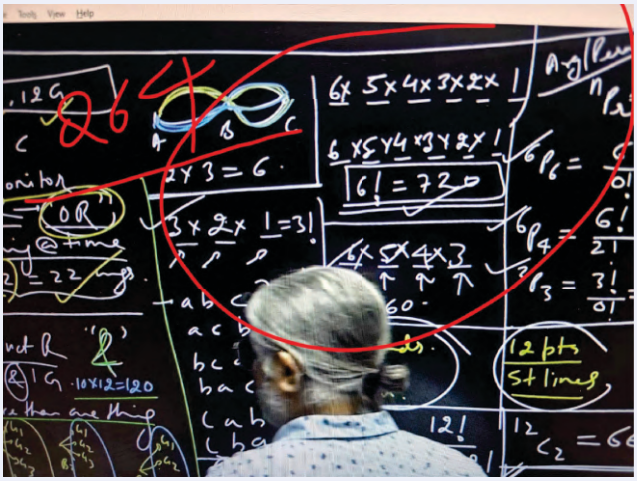
64. In how many ways can 5 prizes be distributed among 4 candidates when every candidate can take one or more prizes?

(a) 1024 (b) 625

(c) 600 (d) 120

Ans. (a)

$4^5 = 1024$



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End of Solution

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65. Consider the following equation:
$(x + y + 1)dx + (2x + 2y + 3)dy = 0$
Solving the equation will be
(a) $u - \log(u + 1) = x + c$
(b) $2u + \log(u - 1) = x + c$
(c) $2u - \log(u + 1) = x + c$
(d) $u + \log(u - 1) = x + c$
where: u is $(x + y + 1)$

Ans. (c)

$$\frac{dy}{dx} = -\left[\frac{(x+y)+1}{2(x+y)+3}\right]$$

Let $x = y = z$; $1+\frac{dy}{dx} = \frac{dz}{dx}$

$$\frac{dz}{dx} - 1 = -\left[\frac{z+1}{2z+3}\right]$$

$$\frac{dz}{dx} = \frac{-z-1+2z+3}{2z+3}$$

$$\frac{dz}{dx} = \frac{z+2}{2z+3}$$

$$\Rightarrow \quad \frac{2z+3}{z+2}dz = dx$$

$$\Rightarrow \quad \frac{2(z+2)-1}{z+2}dz = dx$$

$$\int 2dz - \int \frac{1}{z+2}dz = \int dx$$

$$2z - \log(z + 2) = x + c$$

$$2(x + y + 1) - \log(x + y + 2) = x + c$$

$$2u - \log(u + 1) = x + c$$

End of Solution

66. If 8 children and 8 men complete certain job in 6 days and if each child takes twice the time taken by a man to finish the same work, in how many days 8 men will finish the same work?

(a) 12 days
(b) 10 days
(c) 9 days
(d) 8 days

Ans. (c)

$$1\ m = 2\ C$$
$$[8\ C + 8\ m] \times 6 = 8\ m \times x$$
$$[4\ m + 8\ m] \times 6 = 8\ m \times x$$
$$12\ m \times 6 = 8\ m \times x$$
$$x = 9$$

End of Solution

67. Consider the following matrix:

$$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$$

The Eigen values are

(a) –3, –3 and 5
(b) –3, 3 and –5
(c) 3, 3 and –5
(d) 3, –3 and 5

Ans. (a)

$\because$ $c_1 + c_2 + c_3 = -3$

$\Rightarrow$ $\lambda_1 = -3$

$\lambda_1 + \lambda_2 + \lambda_3 = \text{Trace (A)}$

$-3 + \lambda_2 + \lambda_3 = -1$

$\lambda_2 + \lambda_3 = 2$ ...(i)

$\lambda_1 \lambda_2 \lambda_3 = |A|$

$(-3)\ \lambda_2 \lambda_3 = 45$

$\lambda_2 \lambda_3 = -15$ ...(ii)

Solving (i) and (ii), we get

$\lambda_2 = 5$

$\lambda_3 = -3$

End of Solution

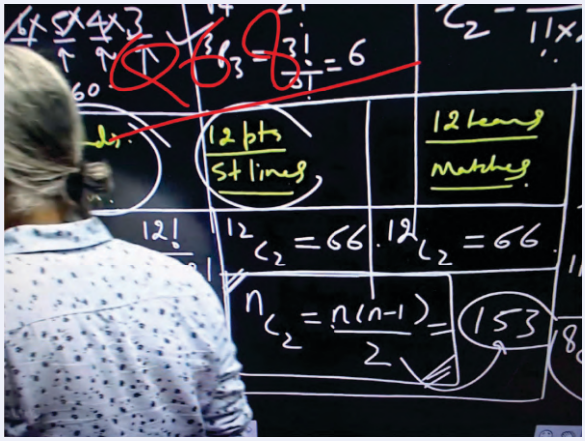
68. If at a get-together 22 people shake their hands with each other, how many handshakes will take place in all?

(a) 132 (b) 231

(c) 321 (d) 484

Ans. (b)

$$^{22}C_2 = \frac{22 \times 21}{2} = 231$$



MADE EASY Class Lecture

End of Solution

69. If $\vec{v} = (xyz)\hat{i} + (3x^2y)\hat{j} + (xz^2 - y^2z)\hat{k}$, the value of divergence of $\vec{v}$ at point (2, –1, 1) will be

(a) 14 (b) 16

(c) 18 (d) 20

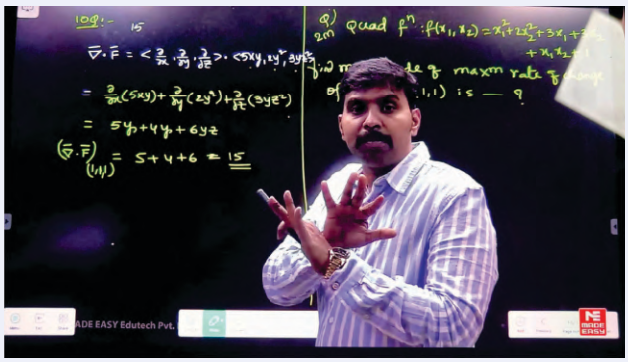
Ans. (a)

$$div\vec{V} = \vec{\nabla}\cdot\vec{V}$$

$$= \frac{\partial}{\partial x}(xyz) + \frac{\partial}{\partial y}(3x^2y) + \frac{\partial}{\partial z}(xz^2 - y^2z)$$

$$(\vec{\nabla}\cdot\vec{V})_{(2,-1,1)} = (yz + 3x^2 + 2xz - y^2)_{(2,-1,1)}$$

$$= -1 + 12 + 4 - 1 = 14$$



MADE EASY Class Lecture

End of Solution

70. The square root of the complex number $5 + 12i$ will be

(a) $3 + 2i, -3 - 2i$ (b) $2 - 3i, -2 - 3i$

(c) $3 - 2i, 3 + 2i$ (d) $2 + 3i, 2 - 3i$

Ans. (a)

$$\sqrt{5+12i} = z$$

$$\sqrt{5+12i} = (x + iy)$$

$$5 + 12i = x^2 - y^2 + 2ixy$$

$$x^2 - y^2 = 5$$

$$2xy = 12$$

$$xy = 6$$

$$(x^2 + y^2)^2 = (x^2 - y^2)^2 + 4(xy)^2$$

$$(x^2 + y^2)^2 = 25 + 4 \times (6)^2$$

$$= 25 + 144$$

$$(x^2 + y^2)^2 = 169$$

$$x^2 + y^2 = 13$$

Now,

$$x^2 - y^2 = 5$$

$$x^2 + y^2 = 13$$

$$2x^2 = 18$$

$$x^2 = 9$$

$$x = \pm 3$$

$$xy = 6$$

$$x = 3 \Rightarrow y = 2$$

$$x = -3 \Rightarrow y = -2$$

So, $z = 3 + 2i$ and $z = -3 - 2i$

Alternatively,

Varify with options

$$z = 3 + 2i$$

$$z^2 = (3 + 2i)^2 = (9 - 4) + 12i = 5 + 12i$$

$$z = -3 - 2i$$

$$z^2 = (-(3 + 2i))^2 = (3 - 2i)^2 = 5 + 12i$$

End of Solution

71. Three pipes *A*, *B* and *C* can fill a tank in 6 hours. When the tank was empty, all the three pipes were turned on and they worked together for 2 hours, at that instant, pipe *C* was closed and the pipes *A* and *B* continued to work to fill the tank. It took a total of 7 hours from start to fill the tank this way. If pipe *C* alone is working from the start, the time it takes will be

(a) 10 hours (b) 14 hours
(c) 30 hours (d) 45 hours

Ans. (c)

$$1 \text{ hr work of } (A + B + C) = \frac{1}{6}$$

$$2a\ 2 \text{ hrs } (A + B + C) = \frac{2}{6} = \frac{1}{3}$$

$$\text{Rew} = \frac{2}{3}$$

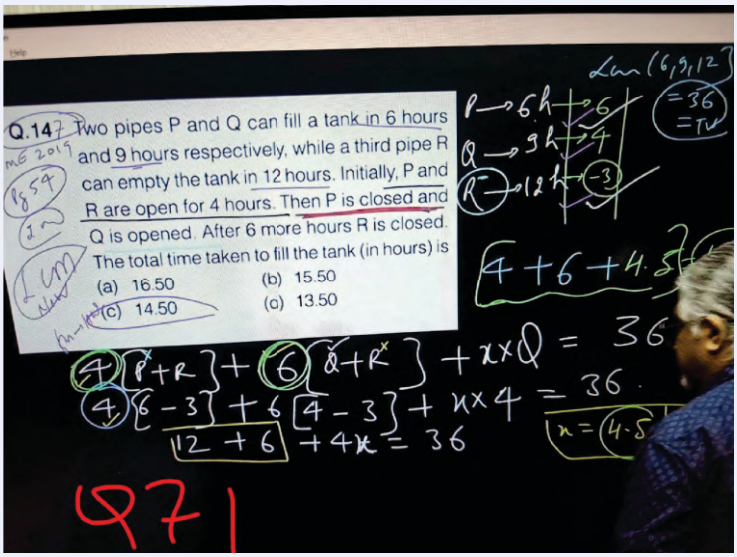
$$\text{In 5 hrs } (A + B) = \left(\frac{2}{3}\right)$$

$$1 \text{ hr } (A + B) = \frac{2}{15}$$

$$1 \text{ hr work of } C = \frac{1}{6} - \frac{2}{15}$$

$$= \frac{5}{30} - \frac{4}{30} = \frac{1}{30}$$

C in 30 hrs alone.



MADE EASY Class Lecture

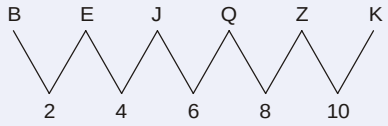
End of Solution

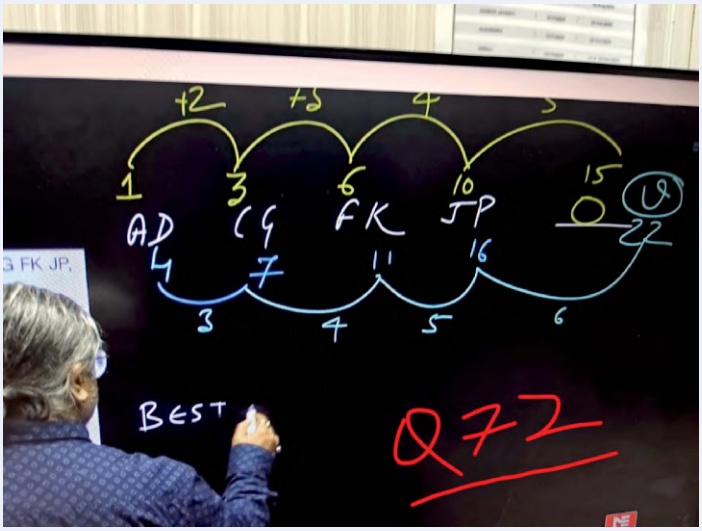
72. The given number of letters skipped increase in the order of 2, 4, 6, 8, ... Which of the following series observes the rule given?

(a) ADIOVF (b) BEJQZK

(c) DGKOTX (d) GIKMOQ

Ans. (b)





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End of Solution

73. The weight of 3 mangoes and 2 apples is 255 grams. The weight of 2 mangoes and 3 apples is 285 grams. Each mango weighs the same and each apple weighs the same. The combined weight of 1 mango and 1 apple will be

(a) 98 grams (b) 104 grams

(c) 108 grams (d) 114 grams

Ans. (c)

$$3m + 2a = 255 \quad \ldots(i)$$

$$2m + 3a = 285 \quad \ldots(ii)$$

Solving equation (i) and (ii), we get

$$a = 69,\ m = 39$$

$$a + b = 108$$

End of Solution

74. A builder decided to build a farmhouse in 40 days. He employed 100 men in the beginning and 100 more after 35 days and completed the construction in the stipulated time. If he had not employed additional men, how many days behind the schedule the construction would have been finished?

(a) 2 days (b) 5 days

(c) 10 days (d) 15 days

Ans. (b)

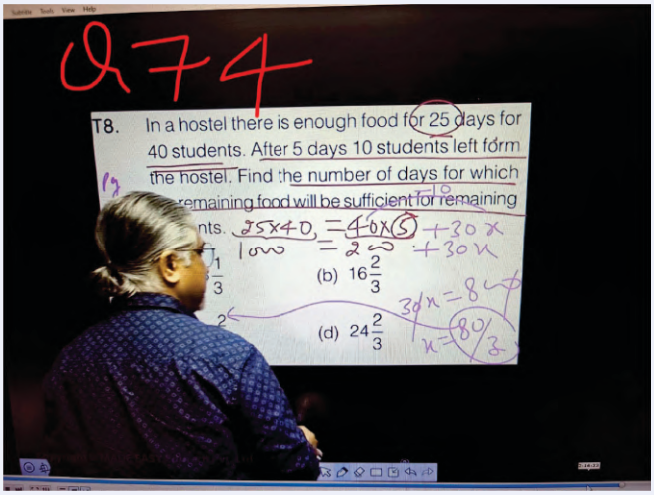
$$100 \times 35 + 200 \times 5 = 100 + x$$

$$100[35 + 10] = 100 + x$$

$$x = 45$$

Behind schedule,

$$45 - 40 = 5 \text{ days}$$



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End of Solution

75. Two trains 120 m and 80 m length are running in opposite direction with velocities 42 km/hour and 30 km/hour respectively. To cross each other completely, the time taken will be

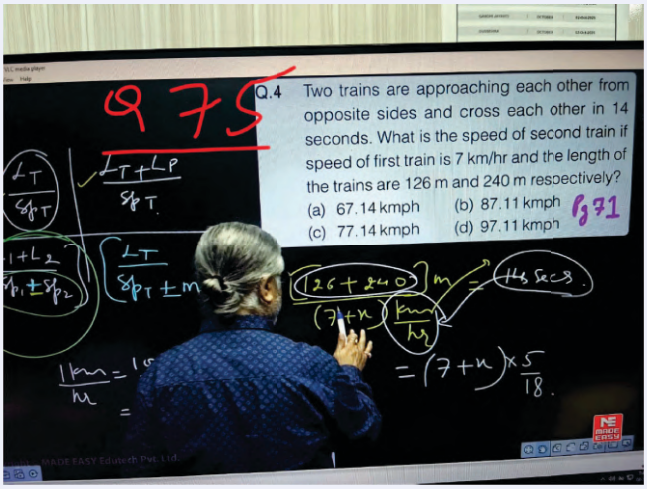
(a) 10 sec (b) 15 sec
(c) 18 sec (d) 20 sec

Ans. (a)

(120 + 80) m

$(42+30)\times\frac{5}{18}$ m/sec

$\frac{200}{20}$ = 10 sec



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End of Solution

76. One student gets 20% of marks in an examination and fails by 30 marks. Another student secures 32% of marks and gets 42% marks more than that required to pass. The percentage of marks required to pass in that examination will be

(a) 22% of marks (b) 25% of marks

(c) 28% of marks (d) 30% of marks

Ans. (a)

$$32\% \text{ of } T - 42\% \text{ of } P = P$$

$$P = \frac{32}{142} \text{ of } T = 0.2253\ T = 22.53\%$$

If inplace of 42%, 42 is given

$$20\% \text{ of } T + 30 = P = 32\% \text{ of } T - 42\%\ P$$

$$T = 600$$

$$P = 20\% \text{ of } 600 + 30 = 150$$

$$\text{Passing mark} = \frac{150}{600} \times 100 = 25\%$$

End of Solution

77. A concrete post, planted vertically in a lake is seen with its top 7 m projecting above the water surface. If its $\frac{1}{3}, \frac{1}{4}$ and $\frac{1}{8}$ parts of the length are in water, mud and sand respectively, the length of the post will be

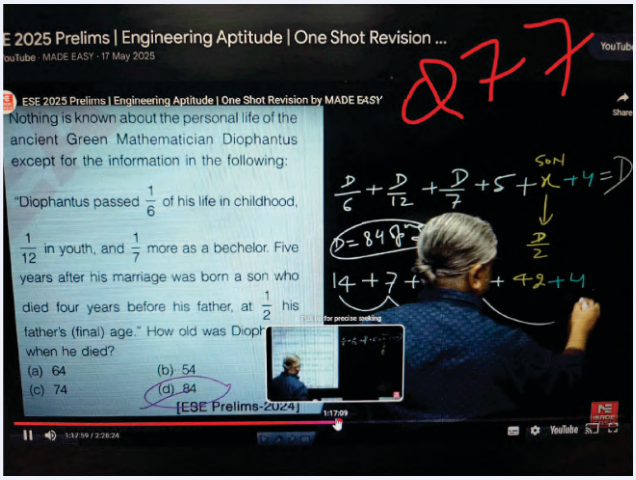
(a) 24 m (b) 27 m

(c) 36 m (d) 42 m

Ans. (a)

$$T\left[1 - \frac{1}{3} - \frac{1}{4} - \frac{1}{8}\right] = 7$$

$$T = 24$$



MADE EASY Class Lecture

End of Solution

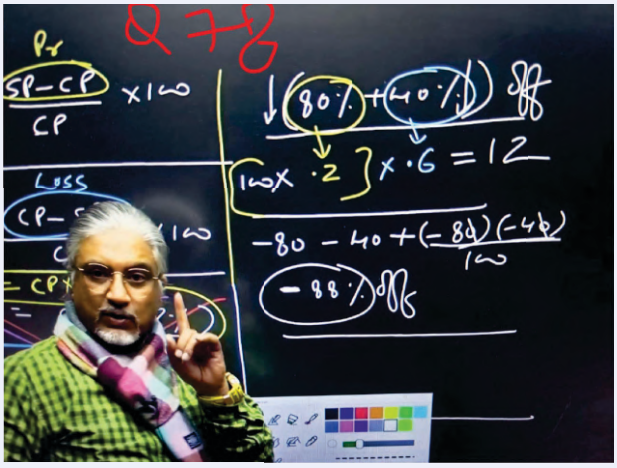
78. The value of a machine depreciates every year by 5%. If the present value of the machine be ₹100,000, its value after 3 years will be nearly

(a) ₹95,198 (b) ₹90,376

(c) ₹87,556 (d) ₹85,738

Ans. (d)

$100000 \times 0.95 \times 0.95 \times 0.95 \approx 85738$



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End of Solution

79. A construction work is to be completed in 46 days by 117 men at work, 8 hours being the working period per day. After 33 days, it is found that only $\frac{4}{7}$ of the work is completed. If the working time is increased to 9 hours/day, the number of additional men required to complete the work in 46 days period will be

(a) 72 men (b) 81 men

(c) 90 men (d) 99 men

Ans. (b)

$$33 \times 117 \times 8 = \frac{4}{7}TW$$

$$TW = \frac{7 \times 33 \times 117 \times 8}{4}$$

Now $\frac{3}{7}$ of TW have to be done in remaing 13 days working 9 hrs each day

$$\frac{3}{7} \times \left[\frac{7 \times 33 \times 117 \times 8}{4}\right] = y \times 13 \times 9$$

$$y = 198$$

$$\text{Additional men} = 198 - 117$$

$$= 81$$

End of Solution

80. A man spends $\frac{2}{5}$ of his salary on groceries and $\frac{3}{10}$ of the remaining on his clothes. If he saves ₹10,500, his monthly salary will be

(a) ₹30,000 (b) ₹15,000
(c) ₹20,000 (d) ₹25,000

Ans. (d)

$$\frac{3}{5}\times\frac{7}{10}\text{ of } T = 10{,}500$$
$$T = 25{,}000$$

End of Solution

81. Which one of the following management functions is correct during the preproduction phase?

(a) Organize (b) Control
(c) Plan (d) Staff

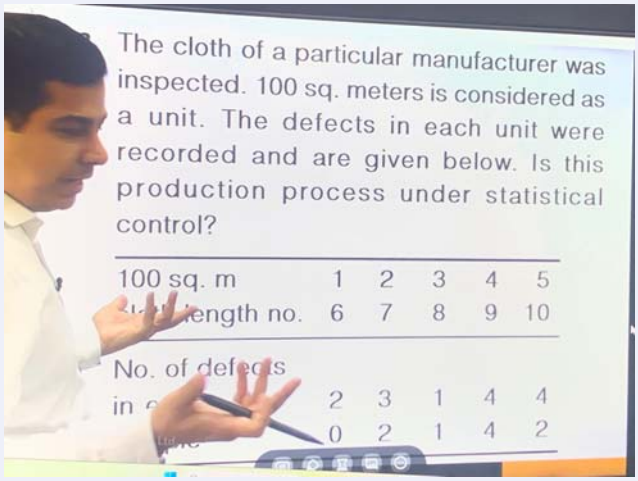
Ans. (d)

End of Solution

82. Which one of the following charts is used in the control charts for monitoring service quality characteristics for number of daily customer complaints in a hotel?

(a) *R*-chart
(b) $\bar{X}$-chart
(c) *p*-chart
(d) *c*-chart

Ans. (d)



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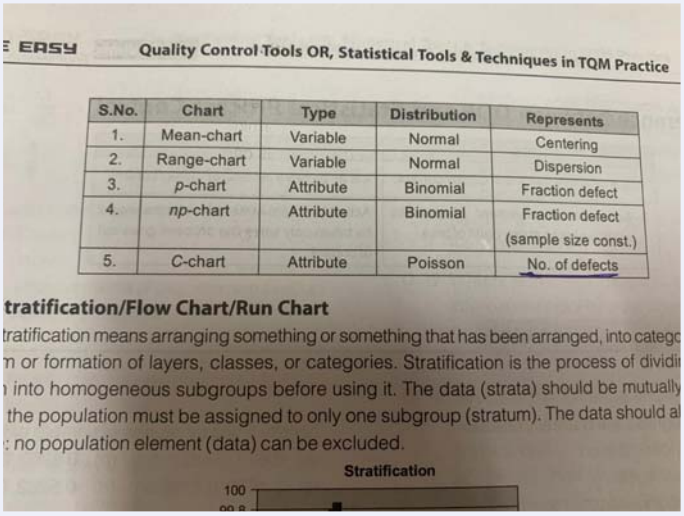


MADE EASY Study Material

End of Solution

83. The reliability number in sampling process is

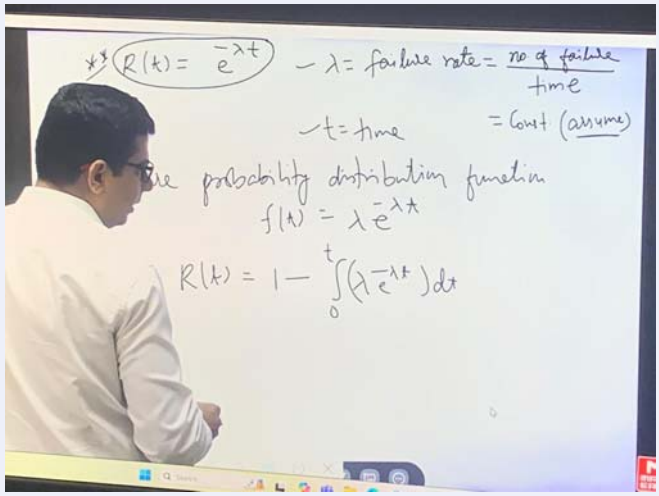
(a) $100 + \left[\frac{\text{Number of defective units}}{\text{Number of units tested}} \times 100\right]$

(b) $100 - \left[\frac{\text{Number of defective units}}{\text{Number of units tested}} + 100\right]$

(c) $100 - \left[\frac{\text{Number of defective units}}{\text{Number of units tested}} \times 100\right]$

(d) $100 + \left[\frac{\text{Number of defective units}}{\text{Number of units tested}} - 100\right]$

Ans. (c)



MADE EASY Class Lecture

End of Solution

84. Which of the following are the noise factors for the experiment on the 'Elastomeric Connector'?

1. Conditioning time
2. Interference
3. Conditioning temperature
4. Connector wall thickness

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

Ans. (d)

End of Solution

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4	D MADHANKUMAR	CLASSROOM COURSE
5	AMAN PRATAP SINGH	CLASSROOM COURSE
6	SANCHIT GOEL	CLASSROOM COURSE
7	SUNIL SEERVI	CLASSROOM COURSE
8	ROHIT KUMAR	CLASSROOM COURSE
9	ANKIT MEENA	TEST SERIES & IGP
10	BADUGU RAJESH	ONLINE COURSE

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1	RAJAN KUMAR	CLASSROOM COURSE
2	SATYAM CH. KHAIRNAR	CLASSROOM COURSE
3	PRIYANSHU MUDGAL	ONLINE COURSE
4	NAMAN AGARWAL	ONLINE COURSE
5	MAYANK KUMAR SINGH	CLASSROOM COURSE
6	RITVIK KOK	ONLINE COURSE
7	MANTHAN SHARMA	CLASSROOM COURSE
8	MAYANK JAIMAN	ONLINE COURSE
9	ANMOL SINGH	ONLINE COURSE
10	AKSHIT PARASHARI	ONLINE COURSE

E&T 10 in Top 10

AIR	Name	Course
1	HIMANSHU THAPLIYAL	CLASSROOM COURSE
2	YASHASVI VIJAYVARGIYA	CLASSROOM COURSE
3	UNNATI CHANSORIA	ONLINE COURSE
4	RAJIV RANJAN MISHRA	CLASSROOM COURSE
5	PARAG SAROHA	ONLINE COURSE
6	CHANDRIKA GADGIL	CLASSROOM COURSE
7	DEBARGHYA CHATTERJEE	CLASSROOM COURSE
8	VIDHU SHREE	ONLINE COURSE
9	T. PIYUSH DAYANAND	CLASSROOM COURSE
10	RAJVARDHAN SHARMA	CLASSROOM COURSE

MADE EASY students top in GATE 2025

• 10 All India Rank 1 (CE, ME, IN, ES & EE) • 46 Selections in Top 10 • 401 Selections in Top 100

CE 10 in Top 10

AIR	Name	Course
CE 1	ABHAY SINGH	CLASSROOM COURSE
CE 2	HARSHVARDHAN SINGH	CLASSROOM COURSE
CE 3	PANKAJ MEENA	CLASSROOM COURSE
CE 4	HARSHIL MAHESHWARI	ONLINE COURSE
CE 5	KARTIK POKHRIYAL	CLASSROOM COURSE
CE 6	SHIVANAND CHAURASIA	ONLINE COURSE
CE 6	NIMISH UPADHYAY	ONLINE COURSE
CE 9	TARUN YADAV	CLASSROOM COURSE
CE 10	ADNAN QUASAIN	CLASSROOM COURSE
CE 10	RAHUL SINGH	ONLINE COURSE

ME+PI 14 in Top 10

AIR	Name	Course
ME 1	RAJNEESH BIJARNIYA	CLASSROOM COURSE
ME 2	GOLLANGI SATEESH	ONLINE COURSE
ME 3	NIMESH CHANDRA	CLASSROOM COURSE
PI 3	ADITYA KUMAR PRASAD	CLASSROOM COURSE
PI 5	KULDEEP SINGH NARUKA	CLASSROOM COURSE
PI 6	KAUSHAL KUMAR KAUSHIK	ONLINE COURSE
PI 7	WALEED SHAIKH	TEST SERIES
ME 7	ABHINN	CLASSROOM COURSE
ME 8	GOUTAM KUMAR	TEST SERIES
ME 10	ASHUTOSH KUMAR	CLASSROOM COURSE
ME 10	JETTI GANATEJA	TEST SERIES
ME 10	MUHAMMED SINAN K	TEST SERIES
ME 10	PITCHIKA KUMAR VASU	ONLINE COURSE
PI 10	M GOPU GANESH	TEST SERIES

EE+CS 6 in Top 10

AIR	Name	Course
EE 1	PRADIP CHAUHAN	TEST SERIES
EE 2	KAILASH GOYAL	CLASSROOM COURSE
EE 6	PUNEET SONI	TEST SERIES
EE 6	SHIVAM KUMAR GUPTA	TEST SERIES
CS 9	OMHARI	TEST SERIES
EE 10	NEELAVA MUKHERJEE	POSTAL PACKAGE & TEST SERIES

IN+EC 9 in Top 10

AIR	Name	Course
IN 1	KAILASH GOYAL	CLASSROOM COURSE
EC 2	ANKUSH PHILIP JOHN	POSTAL PACKAGE & TEST SERIES
IN 2	S. BHATTACHARYA	TEST SERIES
IN 5	SACHIN YADAV	TEST SERIES
EC 5	M. M. NAFEEZ	TEST SERIES
EC 6	PENTELA BHAVANI	TEST SERIES
IN 6	UTKARSH PATIL	CLASSROOM COURSE
IN 7	DEV J. PATEL	TEST SERIES
EC 9	CHILUKURI S. CHARAN	TEST SERIES

ES+XE 7 in Top 10

AIR	Name	Course
ES 1	YASH JAIN	CLASSROOM COURSE
ES 2	JITESH CHOUDHARY	CLASSROOM COURSE
ES 2	TARUN YADAV	CLASSROOM COURSE
XE 3	ROHAN KUMAR BISWAL	TEST SERIES
ES 5	SACHIN KUMAR	CLASSROOM COURSE
ES 7	ANKIT KUMAR	CLASSROOM COURSE
XE 9	APAR HARSH CHANDRA	CLASSROOM COURSE

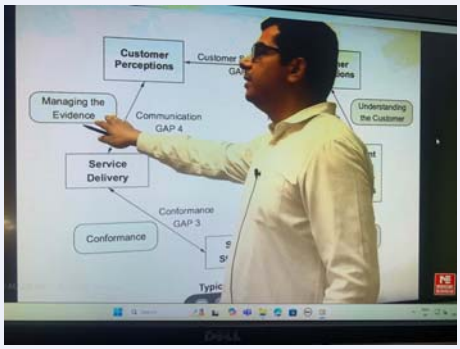
For complete results of ESE & GATE, visit : www.madeeasy.in

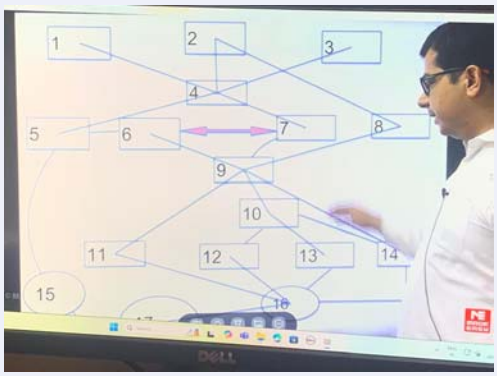
85. Which of the following are the internal factors that influence customer perception of service quality?

1. Knowledge explosion
2. Annual and quarterly reports
3. Social values and changes in lifestyle
4. Increase consumer participation in service delivery through motivated employees

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

Ans. (c)



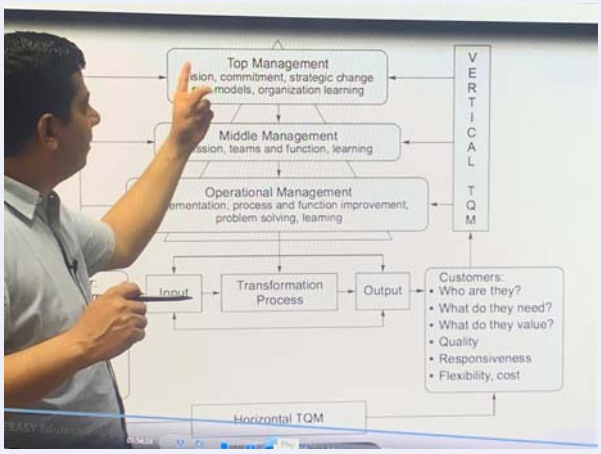


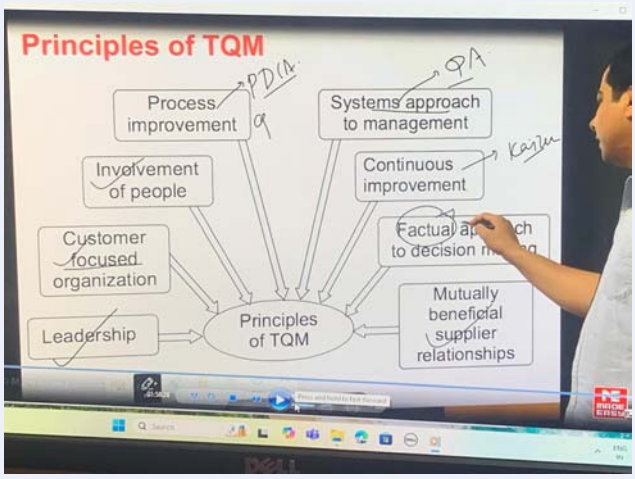
MADE EASY Class Lecture

End of Solution

86. Which one of the following statements is correct regarding TQM?
(a) It proposes hierarchical organization structure
(b) It has a result oriented approach
(c) Its technical efficiency and cost cutting approaches are dominant
(d) It advocates a flatter organization structure with large span of control where authority is pushed as far down as possible

Ans. (d)



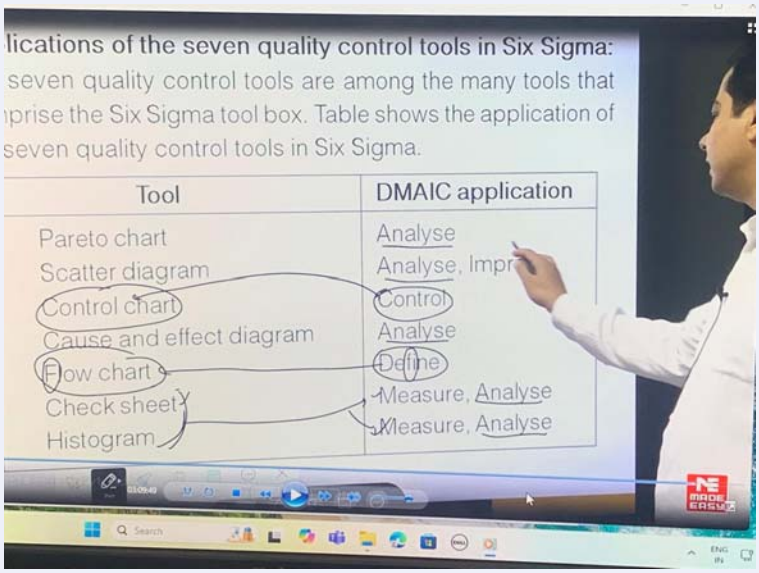


MADE EASY Class Lecture

End of Solution

87. Which of the following are the core steps of '*Six Sigma*' methodology?
(a) Improve, control and measure
(b) Define, measure and analyze
(c) Design, verify and control
(d) Measure, analyze and define

Ans. (b)



MADE EASY Class Lecture

End of Solution

88. Which one of the following is the correct *UCL* for central limits of non-confirming units with constant or variable sample size in control charts for attributes?

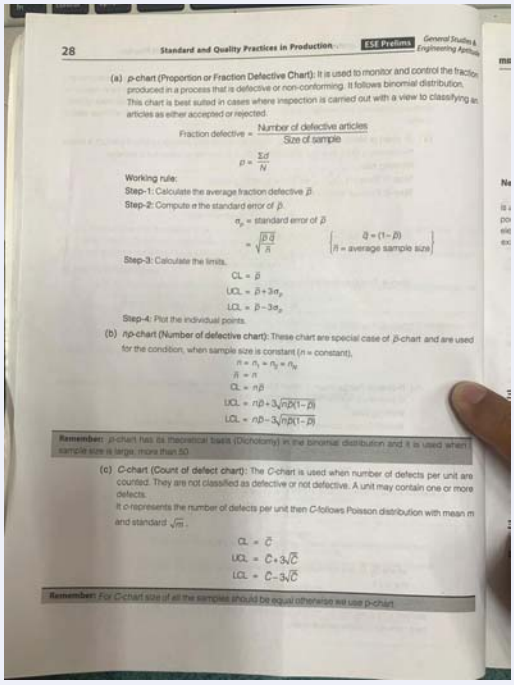
(a) $\bar{P}+\sqrt{3\frac{\bar{P}(1-\bar{P})}{n}}$

(b) $\overline{np}+3\sqrt{np(1-\bar{p})}$

(c) $\bar{c}+3\sqrt{\bar{c}}$

(d) $\bar{u}+3\sqrt{\frac{\bar{u}}{n}}$

Ans. (a)



28 Standard and Quality Practices in Production ESE Prelims General Studies & Engineering Aptitude

(a) *p*-chart (Proportion or Fraction Defective Chart): It is used to monitor and control the fraction produced in a process that is defective or non-conforming. It follows binomial distribution. This chart is best suited in cases where inspection is carried out with a view to classifying an articles as either accepted or rejected.

Fraction defective = Number of defective articles / Size of sample

$p = \frac{\Sigma d}{N}$

Working rule:

Step-1: Calculate the average fraction defective $\bar{p}$.

Step-2: Compute σ the standard error of $\bar{p}$.

σ_p = standard error of $\bar{p}$

$= \sqrt{\frac{\bar{p}\bar{q}}{n}}$ $\quad \{\bar{q} = (1-\bar{p}),\ n$ = average sample size$\}$

Step-3: Calculate the limits.

CL = $\bar{p}$

UCL = $\bar{p}+3\sigma_p$

LCL = $\bar{p}-3\sigma_p$

Step-4: Plot the individual points.

(b) *np*-chart (Number of defective chart): These chart are special case of *p*-chart and are used for the condition, when sample size is constant (n = constant).

$n = n_1 = n_2 = n_N$

$\bar{n} = n$

CL = $n\bar{p}$

UCL = $n\bar{p}+3\sqrt{n\bar{p}(1-\bar{p})}$

LCL = $n\bar{p}-3\sqrt{n\bar{p}(1-\bar{p})}$

Remember: *p*-chart has its theoretical basis (Dichotomy) in the binomial distribution and it is used when sample size is large, more than 50.

(c) *C*-chart (Count of defect chart): The *C*-chart is used when number of defects per unit are counted. They are not classified as defective or not defective. A unit may contain one or more defects.

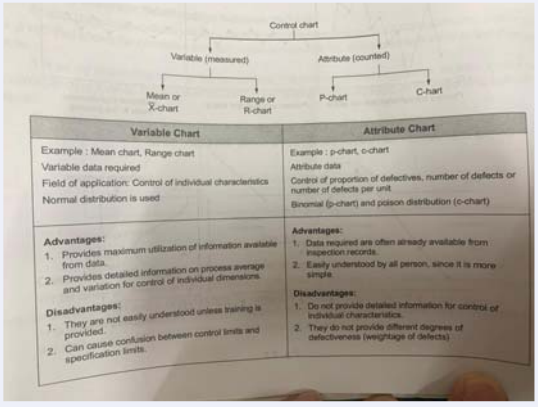
If *c* represents the number of defects per unit then *C* follows Poisson distribution with mean m and standard $\sqrt{m}$.

CL = $\bar{C}$

UCL = $\bar{C}+3\sqrt{\bar{C}}$

LCL = $\bar{C}-3\sqrt{\bar{C}}$

Remember: For *C*-chart size of all the samples should be equal otherwise we use *p*-chart.



Variable Chart	Attribute Chart
Example : Mean chart, Range chart Variable data required Field of application: Control of individual characteristics Normal distribution is used	Example : p-chart, c-chart Attribute data Control of proportion of defectives, number of defects or number of defects per unit Binomial (p-chart) and poisson distribution (c-chart)
Advantages: 1. Provides maximum utilization of information available from data. 2. Provides detailed information on process average and variation for control of individual dimensions. **Disadvantages:** 1. They are not easily understood unless training is provided. 2. Can cause confusion between control limits and specification limits.	**Advantages:** 1. Data required are often already available from inspection records. 2. Easily understood by all person, since it is more simple. **Disadvantages:** 1. Do not provide detailed information for control of individual characteristics. 2. They do not provide different degrees of defectiveness (weightage of defects)

MADE EASY Study Material

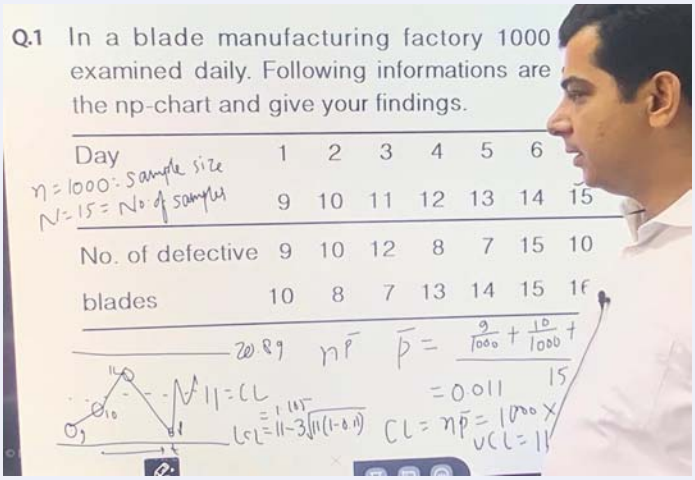
End of Solution

89. Which one of the following relation is correct for *np* regarding quality control?

(a) $\frac{\text{Total number rejected/defective}}{\text{Number of sample}}$ (b) $\frac{\text{Total number rejected/defective}}{\text{Total number inspected}}$

(c) $\frac{\text{Total number defects in all units}}{\text{Total number of units}}$ (d) $\frac{\text{Total number defects in all units}}{\text{Number of sample}}$

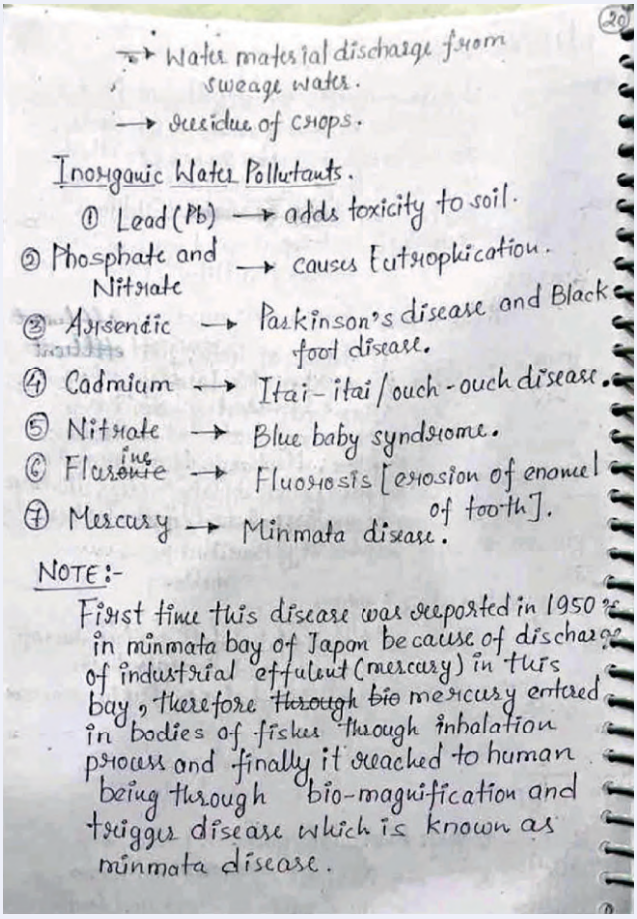
Ans. (a)



End of Solution

90. Nitrate when present in excess in drinking water causes
(a) Fluorosis (b) Minamata
(c) Blur baby syndrome (d) Itai-itai

Ans. (c)



MADE EASY Class Notes

End of Solution

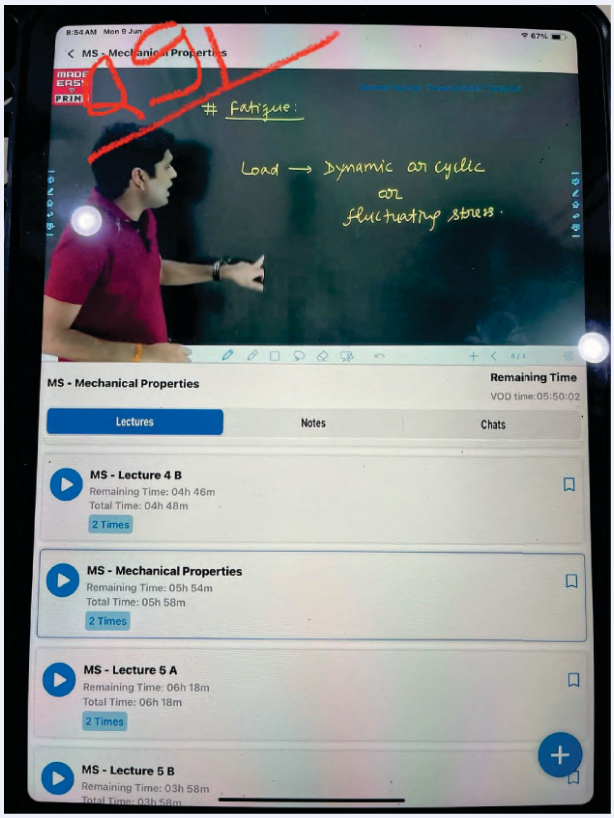
91. About 80% of the failures of mechanical components are due to which one of the following failure resulting from the fluctuating stresses?

(a) Shear failure
(b) Fatigue failure
(c) Dynamic load failure
(d) Normal shear failure

Ans. (b)

Fatigue is a form of failure that occurs in structures subjected to dynamic and **fluctuating** stresses.

Fatigue is important in as much as it is the single largest cause of failure in metals, estimated to comprise approximately 90% of all metallic failures, polymers and ceramics (except for glasses) are also susceptible to this type of failure.



MADE EASY Class Lecture

End of Solution

92. Consider the following steps regarding basic procedure of design of machine element:
1. Select suitable material for element
2. Specify functions of elements
3. Determine failure mode of element
4. Determine forces acting on element

What is the correct sequence of these steps?

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

Ans. (a)

End of Solution

93. A plane oblique to axis and making same angle with axis as elements do is called

(a) Circle (b) Ellipse
(c) Parabola (d) Hyperbola

Ans. (c)

Here one needs to guess what paper setter wants to mean by the term **'Element'**.

Answer options help you to guess meaning of the word **'element'** from paper setter angle. Since all answer options are the name of conic sections, you easily guess that the word element is indicating some term related with a right cone.

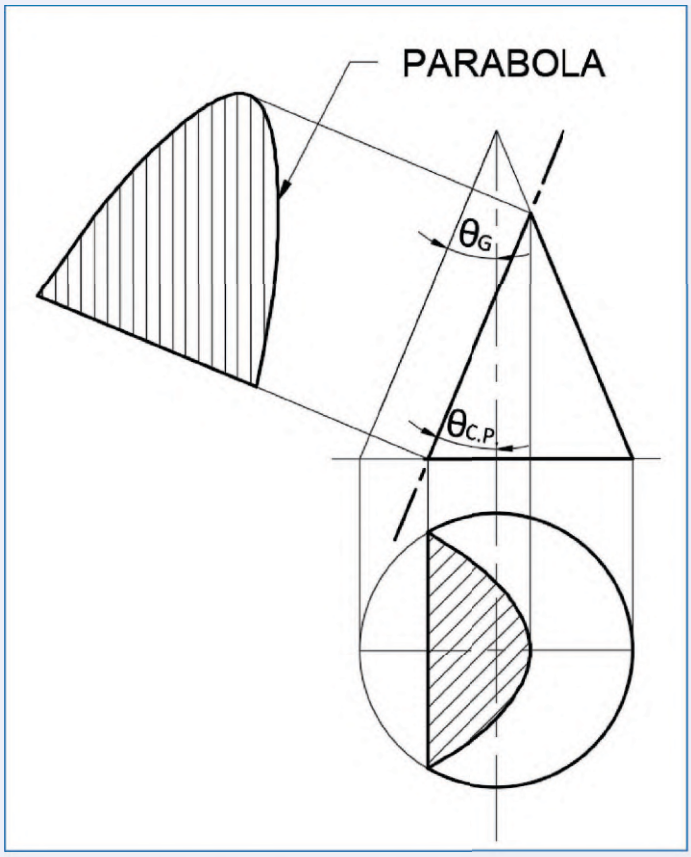
A little thinking will help you to understand that the paper setter is using the word element for generator of a right cone.

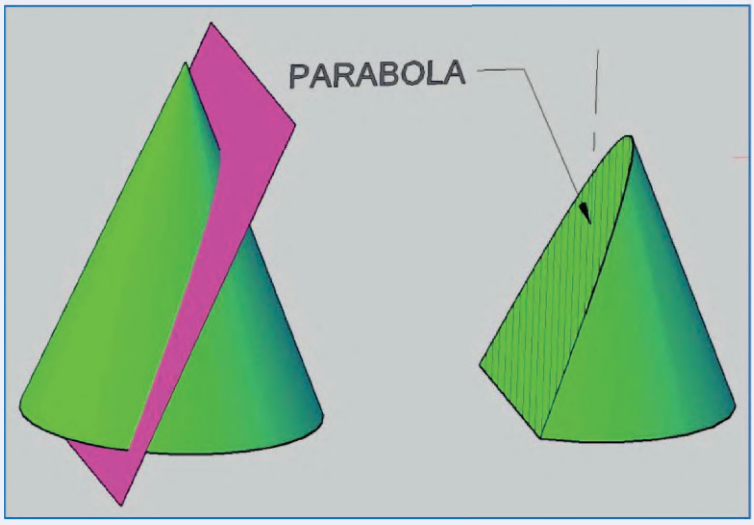
Now the simplified statement of the question is 'A section produced oblique to axis of right cone and making same angle with the axis as the angle that the generator of right cone is making with axis is called'

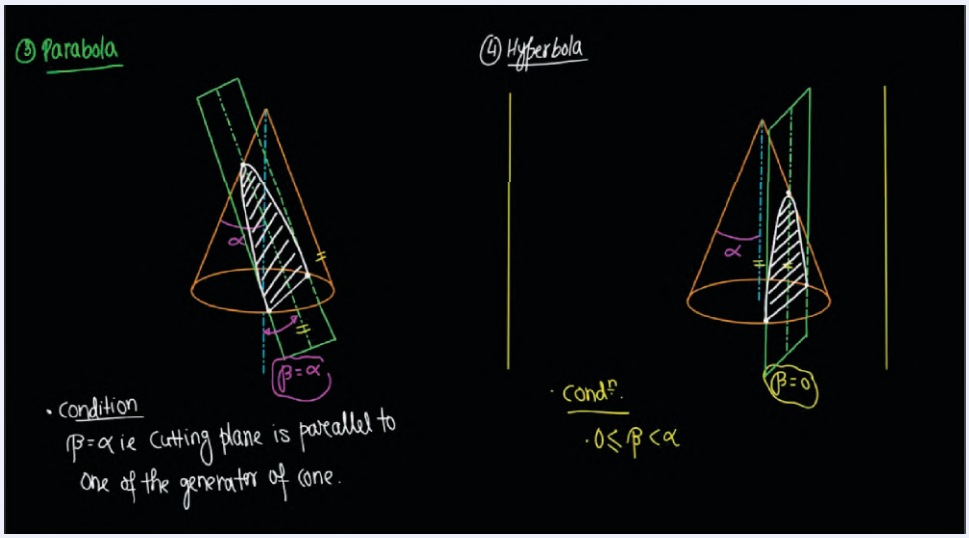
And all of you know that, when inclination of cutting plane with axis of right cone is equal to inclination of generator with axis of right cone then section produced is a Parabola.

Hence the correct answer is (c) Parabola

Diagram below illustrates the concept of parabola in 2D as well as 3D


PARABOLA
θ_G
$\theta_{C.P}$


PARABOLA



MADE EASY Class Lecture

End of Solution

94. Which of the following projections is not a type of parallel projection?

(a) Conic projection
(b) Oblique projection
(c) Orthogonal projection
(d) Curvilinear projection

Ans. (*)

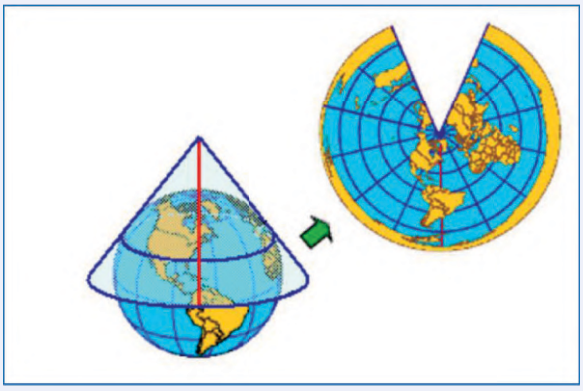
This question has two correct answers (a) Conic projection and (d) Curvilinear projection.

In question, you need to find out the projection method which does not lie under the category of parallel projection.

In Oblique projection the projectors are parallel to each other and oblique to plane of projection. Since in oblique projection projectors are parallel to each other, it lies under the category of parallel projection.

In Orthogonal projection the projectors are parallel to each other and perpendicular to plane of projection. Since in orthogonal projection projectors are parallel to each other, it also lies under the category of parallel projection.

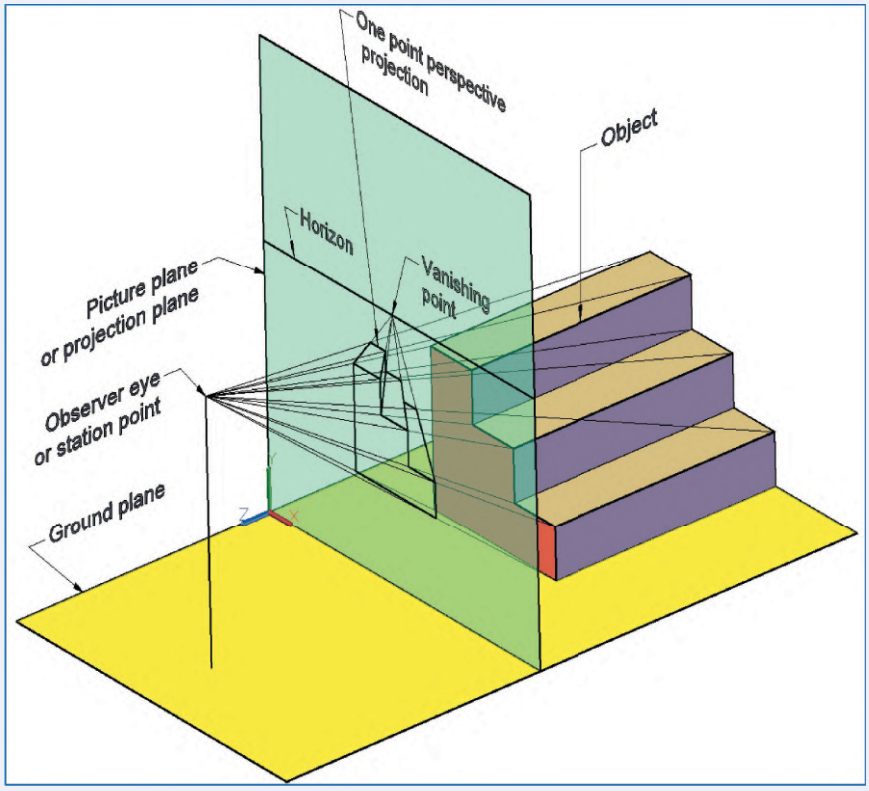
Conic projection is used to project the surface of globe on a cone over it as shown in figure. Surface of cone when developed gives you the map on plane paper sheet. In 3D The projecting light that is projectors are emanating from the center of globe radially outwards. Since projectors converge at center of sphere, Conic projection does not lie under the category of parallel projection.

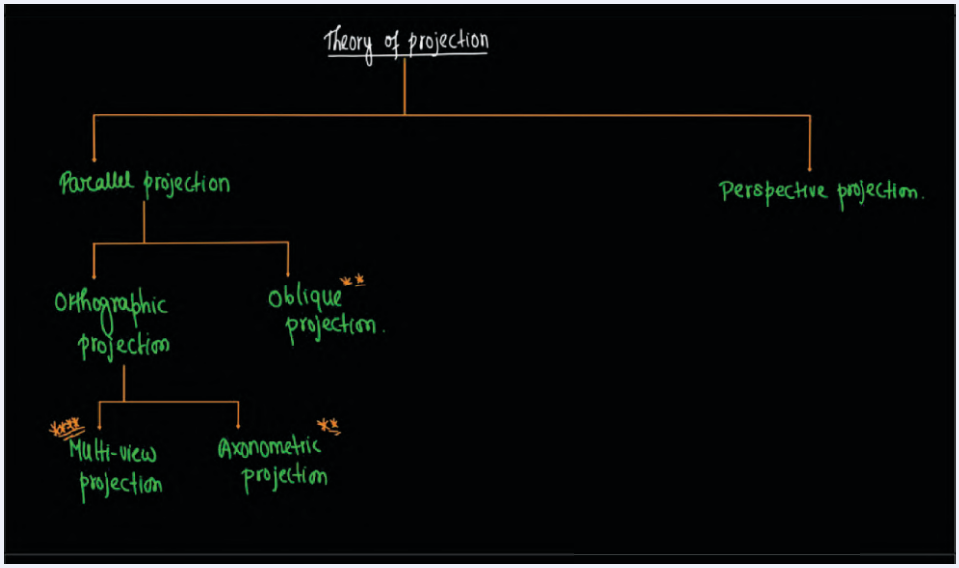


Curvilinear perspective projection is a special type of perspective projection in which spherical shape of retina in human eye is also considered (detailed discussion out of scope of this explanation).

And you know that, in perspective projection, rays of light from different points of the object converge at the observer's eye which is at finite distance from object. Since lines of sight are not parallel to each other in perspective projection, you conclude that perspective projection does not lie under the category of parallel projection. Hence curvilinear perspective projection also does not lie under the category of parallel projection.

Diagram below illustrates the concept of **'One Point Perspective Projection'**





MADE EASY Class Lecture

End of Solution

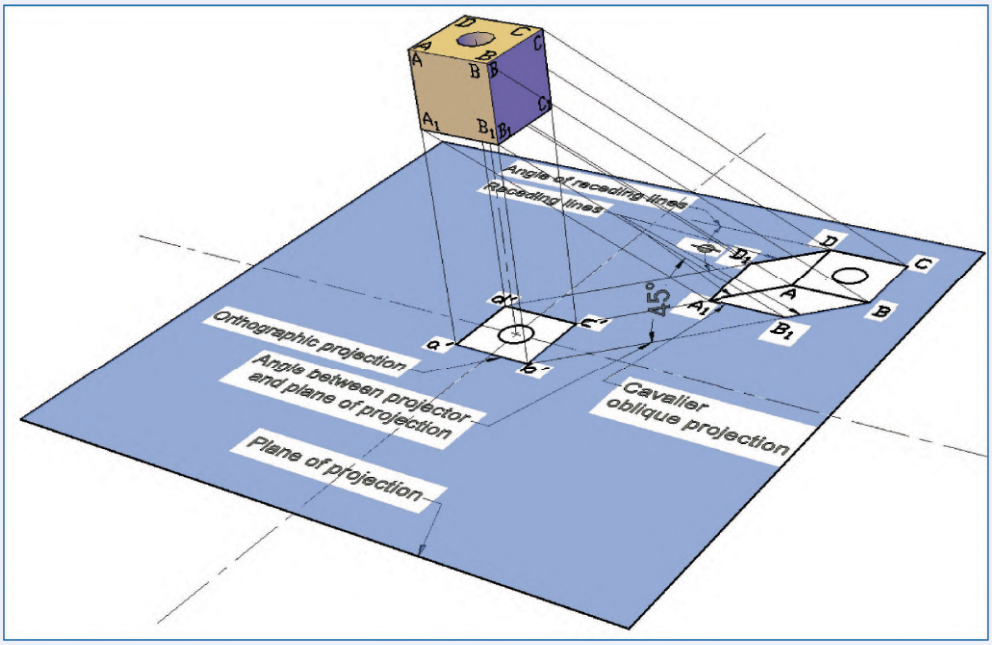
95. When the receding lines are drawn to full size scale and the projectors inclined at an angle of 30° or 45° or 60° to the plane of projection, such oblique projection is known as

(a) Cavalier projection
(b) Cabinet projection
(c) Parallel projection
(d) Isometric projection

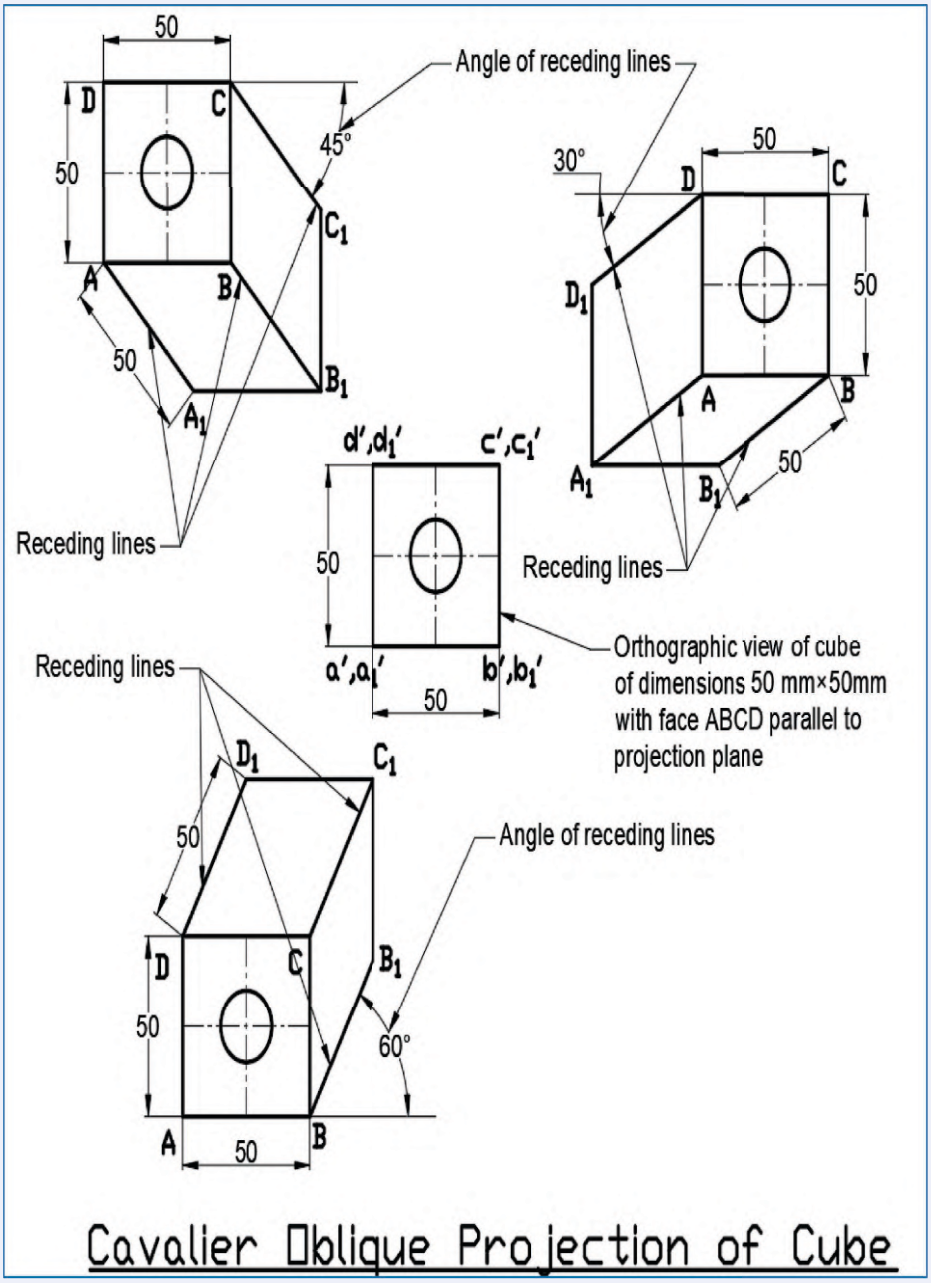
Ans. (a)

Figure below gives the 3-Dimensional concept of cavalier oblique projection. In 3-dimensions, when obtaining cavalier oblique projection, most important face of solid is kept parallel to projection plane and parallel projectors dropped from corner point of solid make 45° angle with plane of projection. in 3-dimensions, lines AA1, BB1, CC1 & DD1 of cube are perpendicular to projection plane and their projection in oblique projection, is called receding lines.

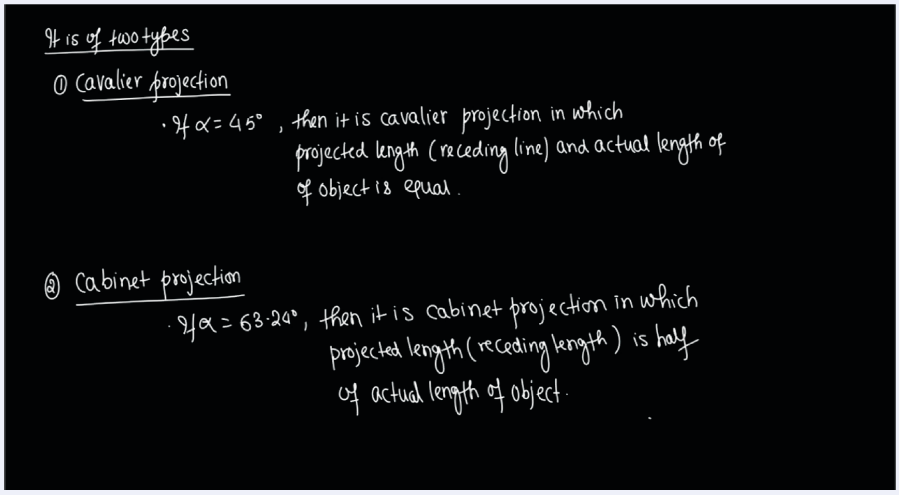
In Cavalier oblique projection, as angle between projectors in 3D space and plane of projection is 45°, analysing geometry & applying little trigonometry you reach the conclusion that receding lines will be of true length.



As shown in figure below, in Cavalier oblique projection, receding lines are drawn to full size scale.



Cavalier Oblique Projection of Cube



MADE EASY Class Lecture

End of Solution

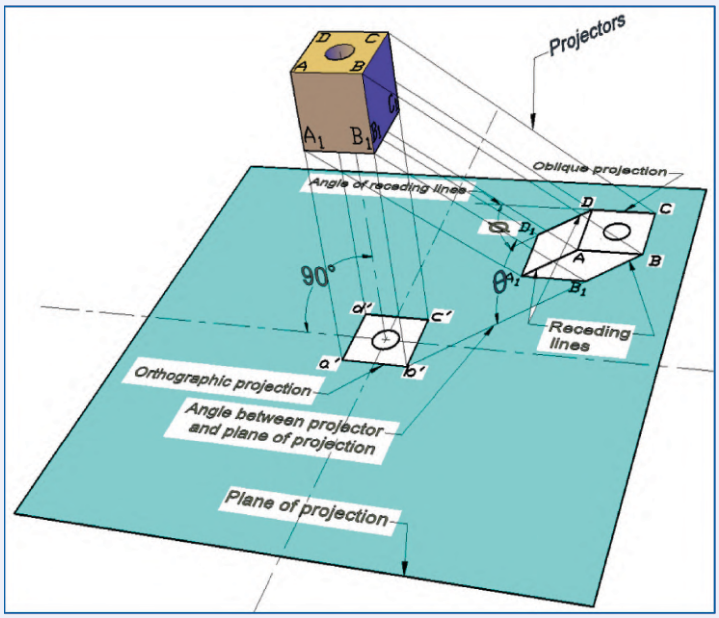
96. When an observer looks towards an object from infinity, the lines of sights (projectors) will be parallel to each other and inclined to the plane of projection. The resulting projection is known as

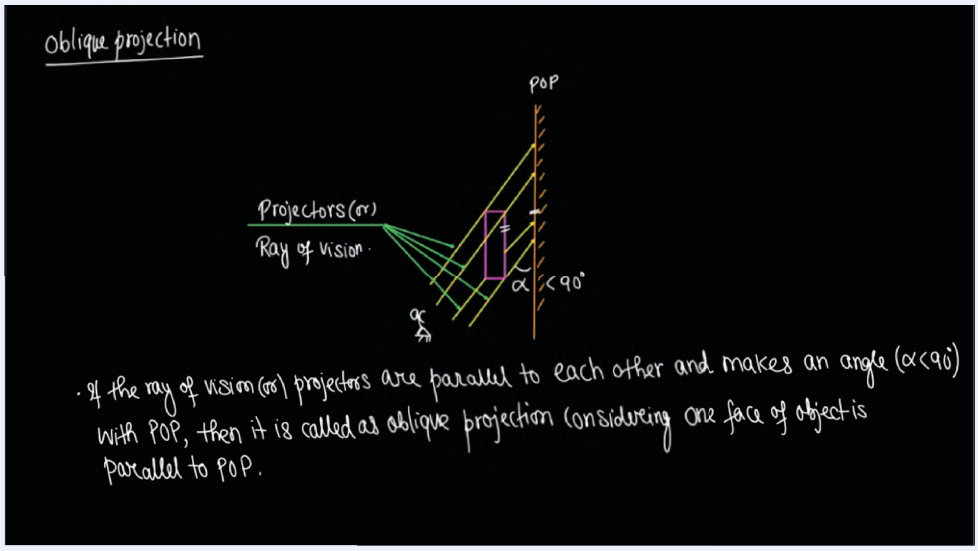
(a) Isometric projection
(b) Orthographic projection
(c) Oblique projection
(d) Axonometric projection

Ans. (c)

In oblique projection, projectors are parallel to each other & oblique to projection plane at any arbitrary angle θ.

Diagram below illustrates the concept of oblique projection.





MADE EASY Class Lecture

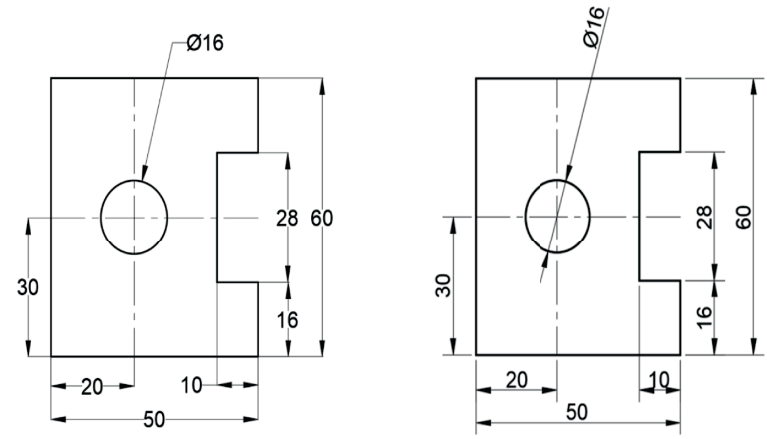
End of Solution

97. Which one of the following systems is recommended in general rules for dimensioning?

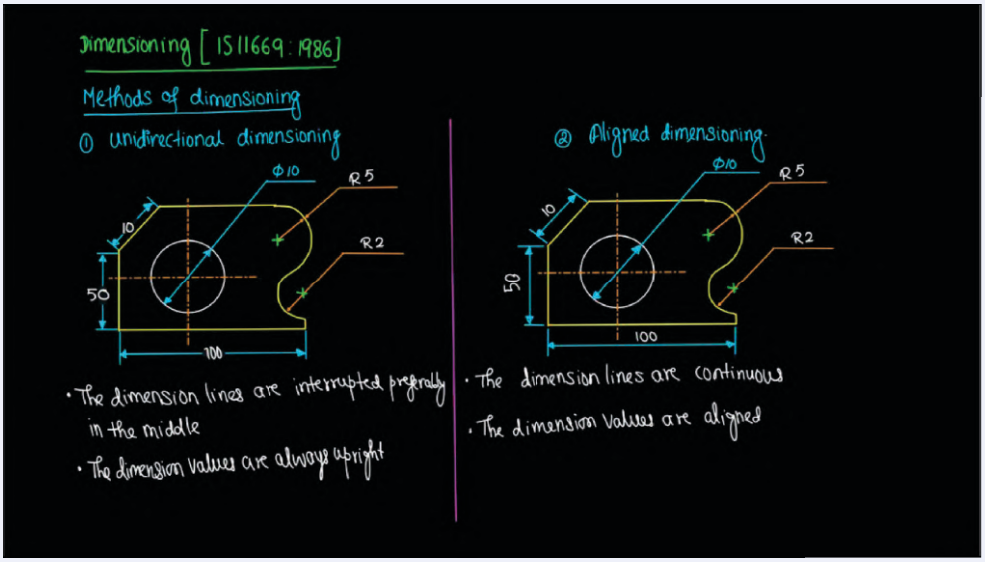
(a) Aligned system
(b) Bidirectional system
(c) Multidirectional system
(d) Unidirectional system

Ans. (d)

Figure below shows a drawing dimensioned in aligned system as well as unidirectional system so that you can understand the difference.



Both Aligned system and Unidirectional system are used in practice.
But when it comes to reading a drawing printed on big size drawing sheet (A0 Size) it is easier to read if all dimensions can be read from bottom & hence, the correct option is (d) unidirectional system.



MADE EASY Class Lecture

End of Solution

98. Any safety programme will be ineffective if any attempt is made to control accidents without first creating
1. Proper safety philosophy
2. Teaching safety principles
3. Eliminating mis-conceptions about the causes of accidents

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

Ans. (d)

End of Solution

99. The Mechanical Engineering designer's problem is to attempt to minimize the factors that affect the fatigue life; these are
1. Electrolyte concentration
2. Temperature
3. Fluid flow rate around specimen

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

Ans. (a)

End of Solution

100. Which of the following statements are correct with respect to mechanical design categories?

1. Failure of the part would endanger human life, or the part is made in extremely large quantities; consequently, an elaborate testing program is justified during design
2. The part is made in less quantities that a moderate series of tests is feasible
3. The part is made in such small quantities that testing is not justified at all; or the design must be completed so rapidly that there is not enough time for testing

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

Ans. (a)

End of Solution

■■■■