GATE WALLAH

18TH FEBRUARY 2024

MORNING SESSION

ESE

ENGINEERING | SERVICE | EXAMINATION

GENERAL STUDIES AND ENGINEERING APTITUDE

PAPER-1

COMMON FOR ALL BRANCHES

PAPER-I

GENERAL STUDIES AND ENGINEERING APTITUDE

Time : 2 Hours **Maximum Marks : 200**

1. Match the following lists:

List-I		List-II	
(P)	Lamarck	(1)	Evolutionary theory
(Q)	Lyell	(2)	Gradual geological processes have gradually shaped Earth's surface
(R)	Malthus	(3)	Human population grow faster than the resources they depend on
(S)	Wallace	(4)	Inheritance of acquired characteristics

Select the correct answer using the code given below:

	P	Q	R	S
(a)	2	1	4	3
(b)	4	2	3	1
(c)	1	4	3	2
(d)	4	3	1	2

2. What is Chaparral?

(a) Chaparrals are plants that grow on other plants

(b) Chaparral is a shrub forest biome dominated by densely-growing evergreen shrubs or small trees, such as scrub oak

(c) Chaparrals are temperate biomes that consist mainly of grasses

(d) Chaparrals are aquatic organisms that live on the surface below a body of water

3. The expression of the ability of surfaces to reflect sunlight is known as

(a) the albedo effect

(b) the greenhouse effect.

(c) the genshin effect

(d) the permafrost

4. Which one of the following refers to efforts to tailor thousands of items such as cars or hamburgers to specific customers' needs ?

(a) Miniaturization

(b) Mass customization

(c) Reactive mode

(d) Fire-fighting

5. Which one of the following is associated with developing a qualitative and/or quantitative evaluation of how changes to system inputs affect system outputs ?

(a) Define (b) Measure

(c) Analyze (d) Control

6. Consider the following advantages of p-charting method:

1. Requires only go-no-go data, intuitive.
2. No requirement for pre-tested "standard" units.
3. Accounts for all errors including systematic errors.

Which of the above advantages is/are correct ?

(a) 1 only (b) 2 only

(c) 1 and 2 (d) 2 and 3

7. Which one of the following is an example of discrete random variables ?

(a) Triangular Distribution

(b) Normal Distribution

(c) Central Limit Theorem

(d) Negative Binomial Distribution

8. Almost all the quality control problems can be solved if the following conditions for manufacturing the product are met:

1. The quality characteristics are within the appropriate specification tolerance limits determined based on customers' requirements.
2. The variability of the quality characteristics is minimized as much as possible.

COMMON FOR ALL BRANCHES

3. The mean of each quality characteristic is as close as possible to the target value of the characteristic.

Which of the above conditions are correct ?

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

9. The manufacturing cost of the components will decrease as a result of using the probabilistic relationship because

(a) manufacturing cost decreases as the tolerance on the quality characteristic decreases
(b) manufacturing cost decreases as the tolerance on the quality characteristic increases
(c) manufacturing cost remains constant as the tolerance on the quality characteristic increases
(d) manufacturing cost increases as the tolerance on the quality characteristic increases

10. It is important to carefully identify the needs and expectations of the customer prior to beginning the design of mechanical device. One of the step in formulating usually quantitative statements of expected performance levels, environmental conditions in which the device must operate, limitations on space or weight, or available materials and components that may be used. These are part of which one of the following elements of design ?

(a) Functions
(b) Evaluation criterias
(c) Design requirements
(d) Drawings

11. Why Delphi method of demand forecasting appeals to many organizations ?

(a) The biases underlying are subjective, and it seems to be more accurate and less expensive than the traditional face-to-face group meetings
(b) It is intelligible to users, it is a fancy name, and it seems to be more accurate and less expensive than the traditional face-to-face group meetings
(c) It has immense appeal, the biases underlying are subjective, and it seems to be more accurate and less expensive than the traditional face-to-face group meetings
(d) It is an expedition's method, it has immense appeal, and it seems to be more accurate and less expensive than the traditional face-to-face group meetings

12. Consider the following statements regarding metallic bonding:

1. The metallic sharing changes with time and the bonding electrons resonate between different atoms.
2. The metallic state can be visualized as an array of positive ions, with a common pool of electrons to which all the metal atoms have contributed their outer electrons.
3. These electrons have freedom to move anywhere within the crystal and act like an all-pervasive, mobile glue holding the ion cores together.

Which of the above statements are correct?

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

13. Consider the following statements regarding phase diagram rules for the crystal:

1. According to the Gibbs phase rule, the degree of freedom, (F) = Number of components (C) + Number of Phases (P)+2.
2. The tie-line rule is applied to determine the compositions of two co-existing phases in a binary phase diagram.
3. In the lever rule, the tie-line at the temperature of interest is treated as a lever arm, with the fulcrum at the overall composition.

Which of the above statements are correct?

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

14. Consider the following statements regarding effect of minor elements on steel properties:

1. Sulphur is present in steel either as iron sulphide or manganese sulphide and during the rolling or forging of steel, iron sulphide present in steel gets cracked/ teared.

COMMON FOR ALL BRANCHES

2. Silicon, in the form of ferrosilicon, is used widely as a deoxidant due to its low cost and high efficiency.
3. Silicon opposes the presence of iron oxide (FeO) which is very much detrimental to properties of steel.

Which of the above statements are correct ?

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

15. Consider the following statements regarding cast iron:

1. Gray cast irons can be classified depending on the shape of graphite that may be present in the form of either flakes or globules.
2. A class of cast iron known as Malleable obtained by treating molten metal by calcium silicide.
3. Meehanite cast irons have graphite nodules but are produced by heat treating white cast irons.

Which of the above statements are NOT correct ?

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

16. Consider the following statements regarding the characteristics of covalent compounds and covalent solids :

1. Covalent compounds are soluble in paraffins.
2. Covalent solids do not form closed-packet structures because the covalent bonds are very strong and rigid.
3. The simplest covalent structure is that of diamond which is fairly open and empty and far from close-packed.

Which of the above statements are correct ?

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

17. Consider the following statements regarding the gas carburizing:

1. Case depth can be obtained accurately.
2. More floor space is required than pack carburizing.
3. Process is rapid as less time is required than in pack carburizing.

Which of the above statements are correct ?

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

18. Which one of the following statements is NOT correct regarding thermal mass ?

(a) In solar buildings, it reduces temperature variations between day and night
(b) It is useful in ordinary buildings as it servs as a reservoir or sink for both heating and cooling
(c) It provides a means of storing the solar energy that enters through the windows
(d) The heavier a material is available, then the less thermal mass is available

19. Consider the following statements about ethanol:

1. Ethanol is primarily produced from com and sugarcane.
2. Ethanol provides a major part of the liquid fuel requirement in Brazil.
3. The production of ethanol accounts for around 90% of the production of biofuels in the world.

Which of the above statements is/are correct ?

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

20. Which one of the following statements is NOT correct regarding carbon dioxide ?

(a) In solar Carbon dioxide is given off when dead organisms and other organic materials decompose, it reduces temperature variations between day and night
(b) When volcanoes erupt, they give off carbon dioxide that is stored in the mantle
(c) Ocean water releases dissolved carbon dioxide into the atmosphere when water temperature rises
(d) A good amount of carbon in the atmosphere is present as methane gas

21. What are the functions of axles?

(a) Support the weight of the mower. Permit easy, rolling movement. Provide for mounting on an axle. Ensure safe operation on flat or sloped lawn surfaces
(b) Support, safely enclose, and protect operating components, including the blade and motor. Accommodate the attachment of two axles and a handle. Permit cut grass to exit the cutting area

(c) Cut blades of grass and weeds while rotating at high speed. Facilitate connection to motor shaft. Operate safely when foreign objects are encountered, such as stones, sticks, or metal pieces

(d) Transfer the weight of mower from the housing to the wheels. Allow rotation of the wheels. Maintain location of the wheels relative to the housing

22. Which one of the following is/are used for drawing curves which cannot be drawn with a compass ?

(a) Scale (b) Protractor

(c) French curves (d) Set square

23. A plane, extended if necessary, will meet the reference planes in lines, unless it is parallel to any one of them. These lines are called

(a) Projection lines

(b) Traces of the plane

(c) Dimension lines

(d) Imaginary lines

24. Which of the following are the methods for determining the line of intersection between surfaces of two interpenetrating solids ?

(a) Line method and cutting plane method

(b) Line method and box methody

(c) Co-ordinate method and cutting plane method

(d) Co-ordinate method and box method

25. Which one of the following is used for pyramids and cones in which the true length of the slant edge or the generator is used as radius ?

(a) Parallel-line development

(b) Radial-line development

(c) Triangulation development

(d) Approximate method

26. Consider the following statements regarding the Global Peace Index 2023:

1. Iceland has retained its position as the most peaceful country since the inaugural study in 2008.
2. Five out of the top 10 most peaceful countries in the world are located in Europe.

Which of the above statements is/are NOT correct?

(a) Both 1 and 2 (b) 1 only

(c) 2 only (d) Neither 1 nor 2

27. Consider the following statements regarding Henley Passport Index 2023 :

1. Japan holds the title of the world's most powerful passport, granting visa-free access to 192 out of 227 global travel destinations.
2. Three European countries, namely' Germany, Italy, and Spain, share the second position, with visa-free access to 190 destinations.

Which of the above statements are NOT correct?

(a) Both 1 and 2 (b) 1 only

(c) 2 only (d) Neither 1 nor 2

28. Consider the following statements :

1. India's Goods and Services Tax collection for the month of June 2023 reached ₹1.61 trillion, according to the Ministry of Finance.
2. India received its highest-ever FDI inflow of US$83.57 billion in the fiscal year 2021-2022.
3. The net direct tax collection in the current fiscal year has witnessed a significant growth of 16%, reaching ₹4.75 lakh crore, indicating a surge in economic activity.

Which of the above statements are correct ?

(a) 1 and 2 only (b) 1 and 3 only

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

29. Consider the following statements regarding Hemis Festival:

1. The Hemis Festival in Ladakh is a renowned religious celebration.
2. The Hemis Festival is dedicated to the birth anniversary of Lord Padmasambhava.
3. Hemis Festival offers a mesmerizing experience of Tibetan Tantric Buddhism.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

COMMON FOR ALL BRANCHES

30. Ministry of Defence signed contract with which one of the following organizations for Upgraded Super Rapid Gun Mount (SRGM) and other equipment for around 3000 crores?

(a) DRDO (b) BHEL

(c) ISRO (d) BEL

31. Which of the following tests are suggested by Philosopher Michael Davis that rely on our commonsense morality, but also reflect some of the concepts in moral theories or approaches ?

(a) Hann Test, Publicity Test, Defensibility Test, Reversibility Test, Virtue Test, Professional Test, Colleague Test and Organization Test

(b) Defensibility Test, Reversibility Test, Virtue Test, Professional Test, Colleague Test, Heat Test, Organism Test and Purity Test

(c) Purity Test, Defensibility Test, Reversibility Test, Professional Test, Colleague Test, Heat Test Organism and Virtue Test

(d) Defensibility Test, Heat Test, Principal Test, Reversibility Test, Virtue Test, Professional Test, Organism Test and Colleague Test

32. If a utilitarian approach requires that we maximize well-being, how should we go about determining the criteria we should use in seeking this maximization ? One approach that has appeal from the engineering perspective is CBA, which holds that the course of action that produces the greatest benefit or utility relative to cost should be chosen. What is the full form of the term CBA?

(a) Cost Benefit Approach

(b) Competitive Benefit Approach

(c) Competitive Benefit Analysis

(d) Cost Benefit Analysis

33. Joshua B. Kardon presents "an engineer is not liable, or responsible, for damages for every error. Society has decided, through case law, that when you hire an engineer, you buy the engineers normal errors. However, if the error is shown to have been worse than a certain level of error, the engineer is liable". That level, the line between non-negligent and negligent error is called

(a) Engineering Judgment

(b) Normal Distribution

(c) Standard of Care

(d) Performance Relative Standard

34. According to Black's Law Dictionary, the law treats the corporation itself as a person which can

(a) monitor (b) maintain

(c) sue and be sued (d) give response

35. Those who drive automobiles are familiar with blind spots. Applying this term to organizational and business arenas, Dennis Moberg draws an analogy between business blind spots and those we experience when driving. Blind Spot is one of the significant common impediments to responsibility. Which one of the following is NOT the method under Blind Spot ?

(a) Self-deception

(b) Willful blindness

(c) In-attentional blindness

(d) Illusion of invulnerability of group

36. Which one of the following is NOT a factor for large scale diversification into unrelated areas by some of the industry Conglomerate in India?

(a) Restriction in growth in the existing line of business

(b) Policies with respect to imports, duties, pricing, and reservations

(c) Opening up of newer areas of investments

(d) Desire not to avail tax incentives

37. Boston Consulting Group, the BCG matrix classifies the various businesses in a firm's portfolio on the basis of

(a) Relative Share and Relative Growth Rate

(b) Relative Market Share and Substantial Market Share

(c) Relative Market Share and Relative Market Growth Rate

(d) Substantial Growth Rate and Relative Market Growth Rate

38. What are the factors that contribute to decline in unit cost with respect to the accumulated volume of production?

(a) Pioneering stage, Rapid growth stage, and Economies of scale stage

(b) Learning effects, Technological improvements, and Economies of scale

COMMON FOR ALL BRANCHES

(c) Technological improvements stage, Maturity stage, and Decline stage
(d) Pioneering stage, Rapid growth stage, and Decline stage

39. Consider the following statements:
The broad areas of corporate appraisal and the few important aspects to be considered under them are
1. Marketing and Distribution
2. Production and Operation
3. Research and Development
4. Project Rating
Which of the above statements are correct?
(a) 1,2,3 (b) 2,3,4
(c) 1,2,4 (d) 1,3,4

40. Which one of the following methods is an important qualitative method under demand forecasting?
(a) Jury of Executive Method
(b) Trend Projection Method
(c) Chain Ratio Method
(d) Bass Diffusion Method

41. Which of the following cities achieved the Guinness World Records by constructing Single Lane Bituminous Concrete Road and longest Double Decker Viaduct with Highway Flyover & Metro Rail?
(a) Amravati and Nagpur
(b) Mumbai and Ahmedabad
(c) Hyderabad and Bangalore
(d) Gautam Buddha Nagar and Ghaziabad

42. Which one of the following Institutions launched Centre of Data for Public Good (CDPG) for multidisciplinary research, bringing together experts from academia, industry, and Government to harness the power of data to benefit the public?
(a) nsc
(b) nT Madras
(c) DRDO
(d) NITIAayog

43. AstroSat space telescope has crossed a major milestone by detecting 600th Gamma-Ray Burst launched by which one of the following countries?
(a) USA (b) Russia
(c) China (d) India

44. Which one of the following ships does NOT come under Indian Na\y's eight. ASW Shallow Water Craft project?
(a) Mahanav (b) Mahe
(c) Malvan (d) Mangrol

45. Which Union Ministry announced '5G & Beyond Hackathon 2023' aimed at shortlisting India-focused cutting-edge ideas workable beyond products and solutions?
(a) Ministry of Science and Technology
(b) Ministry of Communication
(c) Ministry of Micro, Small and Medium Enterprises
(d) Ministry of Electronics and Information Technology

46. "Scheme for Expansion and Modernization of Fire Services m the States from the allocation of preparedness and Capacity Building Fimding Window under the National Disaster Response Fund for strengthening fire services in the States was introduced by which Union Ministry?
(a) Ministry of Family and Health Affairs
(b) Ministry of Youth Affairs and Sports
(c) Ministry of Defence
(d) Ministry of Home Affairs

47. Aim of exercise 'Nomadic Elephant' is to build positive military relations, exchange best practices, develop interoperability, bonhomie, camaraderie and friendship between India and which one of the following countries?
(a) Bangladesh (b) Mongolia
(c) Botswana (d) South Africa

48. Which one of the following is associated with 'SPRINT Challenges' aimed at giving a boost to the usage of 75 new indigenous technologies/ products in collaboration with Innovations for Defence Excellence, NIIO and Technology Development Acceleration Cell?
(a) Indian Coast Guard (b) Indian Air Force
(c) Indian Army (d) Indian Navy

49. To increase the transparency and consumer awareness and handle the customer complaint a 'Centralised Receipt and Processing Centre' and 'Integrated Ombudsman Scheme' has been set up, these two schemes are related to which one of the following institutions?
(a) NITI Aayog (b) DPUT
(c) ISRO (d) RBI

COMMON FOR ALL BRANCHES

50. These days V-CIP is simple, safe and secure. You can complete your V-CIP from wherever you are in India, you only need your PAN card and Aadhaar card. Then, what is the full form of the term "V-CIP" ?

(a) Venture Capital Identification Process
(b) Venture Capital Investment Process
(c) Voice based Customer Identification Process
(d) Video based Customer Identification Process

51. The standard deviation of the exponential distribution of

$$fx(x) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases} \text{ is}$$

(a) $\frac{1}{\lambda}$ (b) $\frac{2}{\lambda^2}$

(c) $\frac{3}{\lambda^3}$ (d) $\frac{2}{\lambda^3}$

52. Suppose that 01% of the people in a certain area have a disease D and that a mass screening test is used to detect cases. The test gives either a positive or a negative result for each person. Ideally, the test would always give a positive result for a person who has D, and would never do so for a person who has not. In practice the test gives a positive result with probability 99-9% for a person who has D, and with probability 0-2% for a person who has not What is the probability that a person for whom the test is positive actually has the disease ?

(a) $\frac{1}{3}$ (b) $\frac{5}{3}$

(c) $\frac{4}{3}$ (d) $\frac{2}{3}$

53. Let the random variable X and Y have joint density function given by

$$fx(x) = 6\left(\frac{1}{2} - x + \frac{x^2}{2}\right) \text{for} \, 0 \leq x \leq 1$$

Then the marginal density function for X is

(a) $fx(x) = 6\left(\frac{1}{2} - x - \frac{x^2}{2}\right) \text{for} \, 0 \leq x \leq 1$

(b) $fx(x) = 6\left(\frac{1}{2} + x + \frac{x^2}{2}\right) \text{for} \, 0 \leq x \leq 1$

(c) $fx(x) = 6\left(\frac{1}{2} + x - \frac{x^2}{2}\right) \text{for} \, 0 \leq x \leq 1$

(d) $fx(x) = 6\left(\frac{1}{2} - x + \frac{x^2}{2}\right) \text{for} \, 0 \leq x \leq 1$

54. The continuous-time signal $f(t) = e^{-2\omega t}$, where ω is a real constant, is sampled when $t \geq 0$ at intervals T. What is the z transform of the resulting sequence of samples?

(a) $\frac{z}{z - e^{-2\omega T}}$ (b) $\frac{z}{1 - e^{-2\omega T}}$

(c) $\frac{z}{z - e^{-\omega T}}$ (d) $\frac{z}{z - e^{2\omega T}}$

55. If $(z) = \frac{z}{z^2 - z + 1}$ then the inverse z transform of Y(z) is

(a) $\sqrt{\frac{1}{3}} \sin \frac{1}{3} k\pi$ (b) $2\sqrt{\frac{1}{3}} \sin \frac{1}{3} k\pi$

(c) $2\sqrt{\frac{1}{3}} \sin \frac{1}{3} k\pi$ (d) $2\sqrt{\frac{1}{3}} \sin \frac{1}{3} k\pi$

56. The temperature distribution $T(x)$ at a distance x, measured from one end, along a bar of length L is given by $T(x) = Kx\,(L - x)\,(0 \leq x \leq L)$, K = constant. A Fourier series expansion consisting of sine terms only for $T(x)$ is

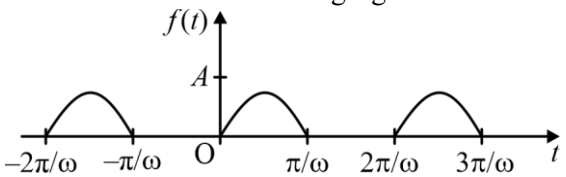
(a) $\frac{8KL^2}{\pi^3} \sum_{n=1}^{\infty} \frac{1}{(2n-1)^3} \sin \frac{(2n-1)\pi x}{L}$

(b) $\frac{8KL^2}{\pi^3} \sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} \sin \frac{(2n-1)\pi x}{L}$

(c) $\frac{8KL^3}{\pi^3} \sum_{n=1}^{\infty} \frac{1}{(2n-1)^3} \sin \frac{(2n-1)\pi x}{L}$

(d) $\frac{8KL^3}{\pi^3} \sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} \sin \frac{(2n-1)\pi x}{L}$

57. Passing a sinusoidal voltage A sin ωt through a half-wave rectifier produces the clipped sine wave shown in the following figure.



COMMON FOR ALL BRANCHES

A Fourier series expansion of the rectified wave is

(a) $f(t)=\frac{A}{\pi}\left[1+\frac{\pi}{2}\sin\omega t+2\sum_{n=1}^{\infty}\frac{\cos 2n\omega t}{4n^2-1}\right]$

(b) $f(t)=\frac{A}{\pi}\left[1+\frac{\pi}{2}\sin\omega t-2\sum_{n=1}^{\infty}\frac{\cos 2n\omega t}{4n^2-1}\right]$

(c) $f(t)=\frac{A}{\pi}\left[1-\frac{\pi}{2}\sin\omega t-2\sum_{n=1}^{\infty}\frac{\cos 2n\omega t}{4n^2-1}\right]$

(d) $f(t)=\frac{A}{\pi}\left[1-\frac{\pi}{2}\sin\omega t+2\sum_{n=1}^{\infty}\frac{\cos 2n\omega t}{4n^2-1}\right]$

58. What is the contour integral $\int_C z2dz$ along the path C from –1 + j to 5 + 3j and composed of two straight line segments, the first from –1 + j to 5 + j and the second from 5 + j to 5 + 3j?

(a) $-4+\frac{196}{3}j$ (b) $-4-\frac{196}{3}j$

(c) $4-\frac{196}{3}j$ (d) $4+\frac{196}{3}j$

59. The image in the w plane of the circle $\left|z+\frac{3}{4}+j\right|=\frac{7}{4}$ under the inversion maping w = 1/z is

(a) a circle centre (1/2, 2/3) and radius 7/6
(b) a circle centre (1/2, –2/3) and radius 7/6
(c) a circle centre (–1/2, 2/3) and radius 7/6
(d) a circle centre (–1/2, –2/3) and radius 7/6

60. The plane x = 1 intersects the paraboloid $z = x^2 + y^2$ in a parabola. The slope of the tangent line to the parabola at (1, 2, 5) is

(a) 2 (b) 6
(d) 4 (d) 5

61. Nothing is known about the personal life of the ancient Greek mathematician Diophantus except for the information in the following:

"Diophantus passed $\frac{1}{6}$ of his life in childhood, $\frac{1}{12}$ in youth, and $\frac{1}{7}$ more as a bachelor. Five years after his marriage was born a son who died four years before his father, at $\frac{1}{2}$ his father's (final) age." How old was Diophantus when he died?

(a) 64 (b) 54
(c) 74 (d) 84

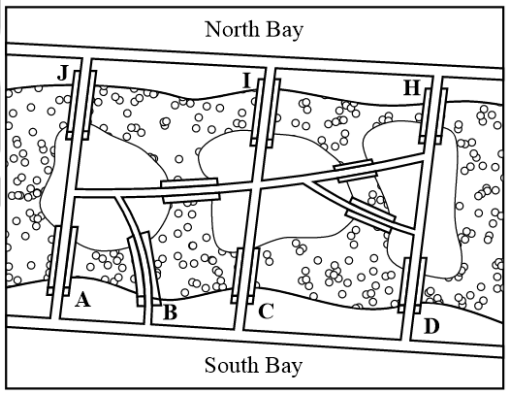
62. Select a two-digit number between 50 and 100. Add 83 to your number. From this number form a new number by adding the digit in the hundreds place to the number formed by the other two digits (the digits in the tens place and the ones place). Now subtract this newly formed number from your original number, to arrive at the final result. What is the final result ?

(a) 16 (b) 26
(c) 36 (d) 46

63. An activities director for a cruise ship has surveyed 240 passengers. Of the 240 passengers, 135 like swimmings 80 like swimming and dancing, 150 like dancing, 40 like swimming and games, 65 like games, 25 like dancing" and games, 15 like all three activities. How many passengers like exactly two of the three types of activities ?

(a) 220 (b) 20
(c) 30 (d) 100

64. The following map shows the 10 bridges and 3 islands between the suburbs of North Bay and South Bay. During your morning workout, you decide to jog over each bridge exactly once. Which one of the following statements is correct?



(a) You want to start from North Bay and that your workout concludes after you jog over the 'D' bridge.
(b) You want to start from North Bay and that your workout concludes after you jog over the 'E' bridge.
(c) You want to start from North Bay and that your workout concludes after you jog over the bridge.
(d) You want to start from North Bay and that your workout concludes after you jog over the 'G' bridge.

COMMON FOR ALL BRANCHES

65. Fifty people were asked to rank their preferences of five varieties of chocolate candy, using 1 for their favorite and 5 for their least favorite. The results are shown in the table below.

	Rankings					
Caramel center	**5**	**4**	**4**	**4**	**2**	**4**
Vanilla center	**1**	**5**	**5**	**5**	**5**	**5**
Almond center	**4**	**1**	**1**	**3**	**4**	**2**
Solid chocolate	**3**	**2**	**3**	**2**	**1**	**1**
Number of voters	**17**	**11**	**9**	**8**	**3**	**2**

According to the table (see the column in grey), three voters ranked solid chocolate first, caramel centers second, almond centers third, toffee centers fourth, and vanilla centers fifth. According to this table, which variety of candy would win the taste test using the plurality voting system?

(a) Almond centers (b) Vanilla centers
(c) Toffee centers (d) Caramel centers

66. The members of a club arc going to elect a president from four nominees. In each first-place vote receives 4 points, each second-place vote receives 3 points, each third-place vote receives 2 points, and each last place vote receives 1 point. If the 100 members of the club mark their ballots as shown in the table below, who will be elected president ?

	Rankings					
Avalon	**2**	**2**	**2**	**2**	**3**	**2**
Branson	**1**	**4**	**4**	**4**	**2**	**1**
Columbus	**3**	**3**	**1**	**3**	**1**	**3**
Dunkirk	**4**	**1**	**3**	**1**	**4**	**4**
Number of voters	**30**	**24**	**18**	**12**	**10**	**6**

(a) Avalon (b) Branson
(c) Columbus (d) Dunkirk

67. Study the given information carefully and answer the question :

There are seven books, one each of Psychology, Hindi, English, Sociology, Economics, Education and Accountancy lying on a table one above the other. Sociology is on the top of all books. Accountancy is immediately below Education which is immediate below Sociology. Economics is immediately above Psychology but not in the middle. Hindi is immediately below Psychology. Which three books are between Accountancy and Hindi ?

(a) English, Economics and Psychology
(b) Economics, Psychology and Education
(c) Economics, Psychology and Hindi
(d) Cannot be determined

68. Read the information given below and answer the question:

There is a group of five girls. Hasini is second in height but younger than Madhavi. Pooja is taller than Pranati but younger in age. Madhavi and Pranati arc of the same age but Madhavi is tallest among them. Neelam is taller than Pooja and elder to Madhavi.

If they are arranged in the descending order of their ages who will be in fourth position ?

(a) Neelam (b) Hasini
(c) Pranati (d) Data inadequate

69. Read the following information and answer the question:

Seven students P, Q, R, S, T, U and V take a series of tests. No two students get similar marks. V always scores more than P. P always scores more than Q. Each time either R scores the highest and T gets the least, or alternatively S scores the highest and U or Q scores the least.

If V is ranked fifth, which one of the following is correct ?

(a) S scores the highest
(b) R is ranked second
(c) T is ranked third
(d) Q is ranked fourth

70. A man has a certain number of small boxes to pack into parcels. If he packs 3, 4, 5 or 6 in a parcel, he is left one, if he packs 7 in a parcel, none is left over. What is the number of boxes, he may have to pack ?

(a) 106 (b) 301
(c) 309 (d) Drawings

71. Suppose we do not know the path of a hang glider, but only its acceleration vector $a(t) = -(3 \cos t)i - (3 \sin t)j + 2k$. We also know that initially (at time t = 0) the glider departed from the point (4, 0, 0) with velocity v(0) = 3j. What is the glider's position as a function of t?

COMMON FOR ALL BRANCHES

(a) $r(t) = (1 + 3\cos t)i - 3\sin tj + t^2k$

(b) $r(t) = (-1 + 3\cos t)i + 3\sin tj + t^2k$

(c) $r(t) = (1 - 3\cos t)i + 3\sin tj + t^2k$

(d) $r(t) = (1 + 3\cos t)i - 3\sin tj + t^2k$

72. What is the absolute minimum value of $f(x, y) = 2 + 2x + 4y - x^2 - y^2$ on the triangular region in the first quadrant bounded by the lines $x = 0$, $y = 0$, and $y = 9 - x$?

(a) -11 (b) -42

(c) -61 (d) -41

73. What is the centroid ($\delta = 1$) of the solid enclosed by the cylinder $x^2 + y^2 = 4$, bounded above by the paraboloid $z = x^2 + y^2$, and bounded below by the xy-plane?

(a) $\left(0,\ 0,\ \frac{3}{4}\right)$ (b) $\left(0,\ 0,\ \frac{4}{3}\right)$

(c) $\left(0,\ 0,\ \frac{5}{4}\right)$ (d) $\left(0,\ 0,\ \frac{4}{5}\right)$

74. What is the integral $\int_1^2 \int_{1/y}^{y} \sqrt{\frac{y}{x}}\, e^{\sqrt{xy}}\, dxdy$

(a) $2e(e + 2)$ (b) $2e(1 - e)$

(c) $2e(e - 2)$ (d) $2e(1 + e)$

75. Fourier transform of $f(t) = \begin{cases} \sin at, & |t| \le \pi/a \\ 0, & |t| > \pi/a \end{cases}$ is

(a) $\frac{2j\sin \pi\omega/a}{-a^2 - \omega^2}$ (b) $\frac{j\sin \pi\omega/a}{-a^2 - \omega^2}$

(c) $\frac{j\sin \pi\omega/a}{a^2 - \omega^2}$ (d) $\frac{2aj\sin \pi\omega/a}{\omega^2 - a^2}$

76. Brianna, Ryan, Tyler, and Ashley were recently elected as the new class officers (president, vice president, secretary, treasurer) of the sophomore class at Summit College. From the following clues, determine which position each holds.

1. Ashley is younger than the president but older than the treasurer.
2. Brianna and the secretary are both the same age, and they are the youngest members of the group.
3. Tyler and the secretary are next door neighbors.

(a) Tyler is the president, Ashley is the vice president, .Ryan is the secretary, and Brianna is the treasurer.

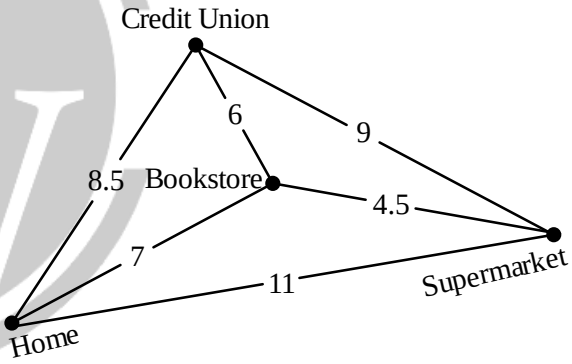
(b) Tyler is the president, Ashley is the vice president, Brianna is the secretary, and Ryan is the treasurer.

(c) Tyler is the president, Ryan is the vice president, Ashley is the secretary, and Brianna is the treasurer.

(d) Tyler is the president, Ryan is the vice president, Brianna is the secretary, and Ashley is the treasurer.

77. You need to buy groceries at the supermarket, deposit a cheque at the credit union, and purchase a book at the bookstore. You can complete the errands in any order; however, you must start and end at your home. The driving time, in minutes, between each of these locations is given in the following figure.

What is the route whose total driving time is less than 30 minutes?



(a) home, bookstore, credit union, supermarket, home

(b) home, supermarket, bookstore, credit union, home

(c) home, bookstore, supermarket credit union, home

(d) home, supermarket, credit union, bookstore, home

78. Each of four siblings (Anita, Tony, Maria and Jose) is given ₹5000 to invest in the stock market. Each chooses a different stock. One chooses a utility stock, another an automotive stock, another a technology stock, and the other an oil stock.

1. Anita and the owner of the utility stock purchased their shares through an online

COMMON FOR ALL BRANCHES

brokerage, whereas Tony and the owner of the automotive stock did not.

2. The gain in value of Maria's stock is twice the gain in value of the automotive stock.
3. The technology stock is traded on NASDAQ, whereas the stock that Tony bought is traded on the New York Stock Exchange.

From the above clues, match the name of the sibling and stock bought.

(a) Maria: the utility stock; Jose: the automotive stock; Anita: the technology stock; Tony: the oil stock

(b) Maria: the utility stock; Anita: the automotive stock; Jose: the technology stock; Tony: the oil stock

(c) Maria: the utility stock; Tony: the automotive stock; Anita: the technology stock; Jose: the oil stock

(d) Jose: the utility stock; Maria: the automotive stock; Anita: the technology stock; Tony: the oil stock

79. If six people greet each other at a meeting by shaking hands with one another, how many handshakes will take place ?

(a) 14 (b) 16

(c) 15 (d) 18

80. Anuhya picks a number. She doubles the number, squares the result, divides the square by 3, subtracts 30 from the quotient, and gets 18. What are the possible numbers that Anuhya could have picked ?

(a) 6 or – 6

(b) 16 or –16

(c) 26 or – 26

(d) 36 or – 36

81. Which one of the following is a set of programs that enables its user to gain administrator-level access to a computer without the end user's consent or knowledge ?

(a) Distributed Denial-of-Service

(b) Phishing

(c) Smishing

(d) Rootkit

82. Which one of the following is software and/or hardware that monitor system and network resources and activities, and notify network security personnel when it detects network traffic that attempts to circumvent the security measures of a networked computer environment ?

(a) An intrusion detection system

(b) A protection of evidence and activity logs system

(c) A critical internet security threats sys

(d) A illusion detection system

83. Which one of the following involves for the examination of Internet records to track down the identity of someone who posted in. a discussion forum on one Website might search for clues to the poster's identity on Facebook, Twitter, and other online sources?

(a) Pornography

(b) Internet Filter

(c) Doxing

(d) Internet censorship

84. Which one of the following Acts mandates schools and libraries in India to use some form of technological protection to block computer access to obscene material, pornography, and anything else considered harmful to minors?

(a) Telecommunications Act

(b) Child Online Protection Act

(c) Children's Internet Protection Act

(d) Communications Decency Act

85. Which of the following Acts is required for the commercial emailers in sending out messages that advertise a commercial product or service?

(a) Controlling the Assault of Non-Solicited Pornography and Marketing Act

(b) Communications Assistance for Law Enforcement Act

(c) Communications Act of 1934

(d) Communications Decency Act

COMMON FOR ALL BRANCHES

86. What are the three stages in the Development of Professional Identity?

(a) Possessing Knowledge, Professional Services, Self-Defining or Integrated Professional

(b) Independent Operator, Professional Services, Self-Defining or Integrated Professional

(c) Possessing Knowledge, Team-Oriented Idealist, Self-Defining or Integrated Professional

(d) Independent Operator, Team-Oriented Idealist, Self-Defining or Integrated Professional

87. The first of the Fundamental Canons of the code of the National Society of Professional Engineers says that engineers shall hold

(a) paramount the safety, health, and welfare of the public

(b) devotion to clients as the first responsibilityy

(c) devotion to his employer

(d) devotion to the public

88. A very compassionate man, Engineer Bernard Amadei in 2001 was profoundly affected by the poor living conditions in underdeveloped countries, such as the absence of clean water. He founded EWB-USA in 2001 for improving the living condition of the poor. Engineering students in EWB are responsible for many projects throughout the world that have enhanced human well-being. What is the full form of the term EWB?

(a) Economically Water Boys

(b) Engineers Well to do Boys

(c) Engineers Without Borders

(d) Engineers Water Boys

89. Consider the following statements :
The philosopher W. D. Ross, who constructed a list of basic duties or obligations, which he called prima facie duties. His lists of prima facie duties are given below:

1. Duties resting on previous acts
2. Duties of gratitude, Duties of justice
3. Duties of beneficence, Duties of self-improvement
4. Duties to injure others, unexceptional to be widely practiced

Which of the above statements are correct ?

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

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

90. What are the types of Moral Judgements?

(a) Permissible, Intent, Obligatory, Standpoint

(b) Professional, Impermissible, Obligatory, Supererogatory

(c) Permissible, Impermissible, Obligatory, Supererogatory

(d) Professional, Impermissible, Obligatory, Standpoint

91. Which one of the following Transmission media is/are used for the remote control communication for televisions, VCRs and stereos etc.?

(a) Fiber optics (b) Fiber cables

(c) The electromagnetic spectrum

(d) Unguided infrared and millimeter waves

92. Which one of the following protocols is used to wrap IP packets with the additional feature of multiplexing and de-multiplexing multiple processes using a single IP address ?

(a) User Datagram Protocol

(b) Transport Control Protocol

(c) Internet Protocol

(d) Point-to-Point Protocol

93. Which one of the following code modules is/are used where the browser fetches from a special directory on the disk and installs as an extension to itself?

(a) Uniform Resource Locators

(b) Browser

(c) Plug-in

(d) Client server

94. Which one of the following features is/are used when a website is complex, consisting of many pages produced by multiple authors working for the same company, often desirable to have a way to prevent a different page from having a different appearance ?

(a) Checkbox (b) Style sheets

(c) Table (d) Forms

COMMON FOR ALL BRANCHES

95. Which one of the languages is used to develop the web pages in the structured and for automated processing?

(a) Extensible Markup Language
(b) Hypertext Markup Language
(c) Extended Hyper Text Markup Language
(d) Markup Language

96. Which one of the following interfaces is used to allow web servers to talk to back-end programs and scripts that can accept input and generate HTML pages in response?

(a) Application Programming Interface
(b) User Interface
(c) Application Interface Marker
(d) Common Gateway Interface

97. Which one of the following status code responses gives the internal server error?

(a) 200 (b) 500
(c) 100 (d) 300

98. Which of the following issues were addressed while establishing an IT Policy ?

1. Respect of the intellectual rights of others, including trade secrets, copyrights, patents, and trademarks
2. Inappropriate use of IT resources, such as Web surfing, blogging, personal emailing, and other use of computers for purposes other than business
3. The need to protect the security of IT resources through adherence to good security practices, such as not sharing user IDs and passwords, using hard-to-guess passwords, and frequently changing passwords.
4. The use of the computer to intimidate, harass, or insult others through abusive language in emails and by other means.

Select the correct answer using the code given below:

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

99. Which one of the following is a harmful program that resides in the active memory of the computer and duplicates itself without human intervention, often sending copies of themselves to other computers by email ?

(a) Worms (b) Viruses
(c) Bugs (d) Spam

100. Which one of the following attacks is one in which a malicious hacker takes over computers via the Internet and causes them to flood a target site with demands for data and other small tasks ?

(a) Rootkits
(b) Distributed Denial-of-Service
(c) Phishing
(d) Smishing

COMMON FOR ALL BRANCHES

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ANSWER KEY																			
1	(b)	11	(b)	21	(d)	31	(a)	41	(a)	51	(a)	61	(d)	71	(d)	81	(d)	91	(d)
2	(b)	12	(c)	22	(c)	32	(d)	42	(a)	52	(a)	62	(a)	72	(c)	82	(a)	92	(a)
3	(a)	13	(c)	23	(b)	33	(c)	43	(d)	53	(d)	63	(d)	73	(b)	83	(c)	93	(c)
4	(b)	14	(d)	24	(d)	34	(c)	44	(a)	54	(a)	64	(b)	74	(c)	84	(c)	94	(b)
5	(c)	15	(c)	25	(b)	35	(d)	43	(d)	55	(b)	65	(c)	75	(d)	85	(a)	95	(a)
6	(a)	16	(c)	26	(c)	36	(d)	46	(d)	56	(b)	66	(b)	76	(d)	86	(d)	96	(d)
7	(d)	17	(d)	27	(b)	37	(c)	47	(b)	57	(b)	67	(a)	77	(d)	87	(a)	97	(b)
8	(d)	18	(d)	28	(d)	38	(b)	48	(d)	58	(a)	68	(*)	78	(a)	88	(c)	98	(d)
9	(b)	19	(d)	29	(d)	39	(a)	49	(d)	59	(b)	69	(a)	79	(c)	89	(c)	99	(b)
10	(c)	20	(d)	30	(b)	40	(a)	50	(d)	60	(c)	70	(b)	80	(a)	90	(b)	100	(b)

❑❑❑

SOLUTIONS

1. (b)

2. (b)

- Shrub forest biome in temperate climate.
- Coastal Biome/Mediterranean climate.
- Shrubs have evergreen leaves.
- Also have small trees like scrub oak tough, yucca, chamise, buckwheat.
- Found in California, central chile, Mediterranean basin, south-west and south Australia,

3. (a)

- Ability of surfaces to reflect sunlight is called Albeda effect
- Light colored surface (High albedo) have ability to reflect more sunlight than dark-coloured surfaces & vice-versa
- 'Albedo' is fraction of light that a surface reflects.

4. (b)

- **Reactive mode:** Refers to responding to unforeseen problems.
- **Fire-fighting:** Refers to reacting to the unexpected occurrences to unforeseen problems. The need to fire-fight is, to a large extent, unavoidable.
- **Miniaturization:** It refers to conforming to specifications in order for the units to yield acceptable performance.
- **Mass-customization:** It refers to tailor thousands of item such as cars or hamburgers to specific customer's need.

5. (c)

In six sigma, system improvement projects are divided into five phases.

1. Define terminates when specific goals for the system outputs are clarified and the main project participants are identified and committed to project success.
2. Measure involves establishing the capability of the technology for measuring system

COMMON FOR ALL BRANCHES

outputs and using the approved techniques to evaluate the state of the system before it is changed.

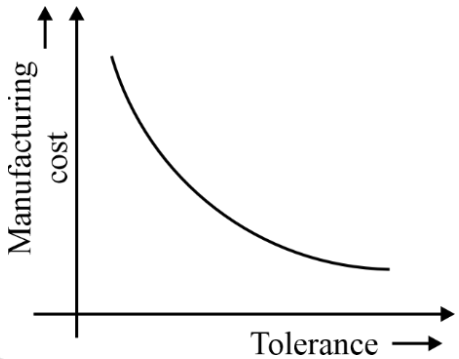
3. Analyze is associated with developing a qualitative and/or quantitative evaluation of how changes to system inputs affect system outputs.
4. Improve involves using the information from the analyze phase to develop recommended system design inputs.
5. Control is the last phase in which any savings from using the newly recommended inputs is confirmed, lessons learned are documented, and plans are made and implemented to help guarantee that any benefits are truly realized.

6. (a)

Methods	Advantages	Disadvantages
Gauge R & R: comparison with standards	Accounts for all errors including systematic errors.	Requires pre-tested "standard units.
Gauge R & R (crossed)	No requirement for pre-tested "standard units	Neglects systematic errors.
Gayge R & R (nested)	Each unit only tested by one appraiser.	Neglects systematic and repeatability errors.
p-charting	Requires only go-no-go data intuitive	Requires many more inspections, less sentitive.
Devnerit charting	Addresses differences between nonconformities.	Requires more inspections, less sensitive.
v-charling	Relatively simple version of demerit charts	Requires more inspections, less sensitive.
$\bar{X}$ and R charting	Uses fewer inspections, gives greater sensitivity.	Requires 2 or more charts for single type of unit.

7. (d)
8. (d)
9. (b)

The manufacturing cost decreases as the tolerance on the quality characteristic increases. Hence, the manufacturing cost of the components will decrease as a result of using the probabilistic relationship.



10. (c)
11. (b)

Delphi method appeals to many organisations for the following reasons:

(i) It is intelligible to users.

(ii) It seems to be more accurate and less expensive than the traditional face-to-face group meetings like in other methods.

12. (c)

- **Functions:** It tell what the device must do, using general, nonquantitative statements that employ action phrases such as to support a load, to lift a crate, to transmit power, or to hold two structural members together.
- **Design requirements:** It requirements are delated, usually quantitative statements of expected performance levels. environmental conditions in which the device must operate, limitations on space or weight, or available materials and components that may be used.
- **Evaluation criterias:** criteria are statements of desirable qualitative characteristics of a design that assist the designer in deciding which alternative design is optimum- that is. the design that maximizes benefits while minimizing disadvantages.

13. (c)

C + 2 = F + P for unary phase diagram and C + 1 = F + P for binary so statement (i) is wrong

14. (d)

S in steel causes embrittlement and to removes it we add mn.

15. (c)

Gray cost irons, excess amount at C is present is the form of flakes or globules. So statement 1 is correct

16. (c)

Only polar compounds case be dissolved in polar. Non polar will dissolve with non polar. So majority at covalent compounds will not dissolve in parallines.

17. (d)

Gag carburizing requires extensive setup like tunnel exhaust puritans and so are so will require more space.

18. (d)

19. (d)

- Ethanol is primarily produced from corn, sugarcane, sugar beets, sorghum etc.
- First generation bio fuel along with bio diesel.
- Ethanol provides a major parts of liquid fuel requirement in Brazil also Brazil and USA are largest produces of ethanol followed by EU and India.
- Major produces of bio diesel are USA, Indonesia.

Percentage of ethanol in production of bio fuels varies from 60% to 70% rest is dominated by bio diesel production.

20. (d)

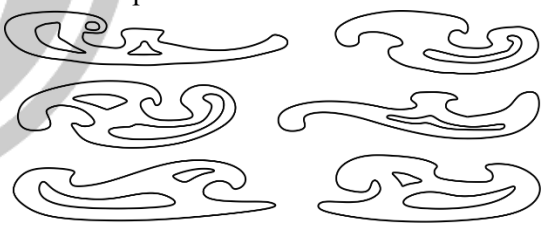
Carbon cycles quickly between organisms and the atmosphere. In the atmosphere, carbon exists primarily as carbon dioxide (CO_2). Carbon dioxide cycles through the atmosphere by several different processes, including those listed below.

- Living organisms release carbon dioxide as a byproduct of cellular respiration.
- Photosynthesis removes carbon dioxide from the atmosphere and uses it to make organic compounds.
- Carbon dioxide is given off when dead organisms and other organic materials decompose.
- Burning organic material, such as fossil fuels, releases carbon dioxide.
- Carbon cycles far more slowly through geological processes such as sedimentation. Carbon may be stored in sedimentary rock for millions of years.
- When volcanoes erupt, they give off carbon dioxide that is stored in the mantle.
- Carbon dioxide is released when limestone is heated during the production of cement.
- Ocean water releases dissolved carbon dioxide into the atmosphere when water temperature rises.
- Carbon dioxide is also removed when ocean water cools and dissolves more carbon dioxide from the air.

21. (d)

22. (c)

- French curves are used for drawing curves which cannot be drawn with a compass.
- Curves having varying radii cannot be drawn with compass.



23. (b)

- Extension of a plane meet reference planes (H.P or V.P.) in form lines are called traces of plane.

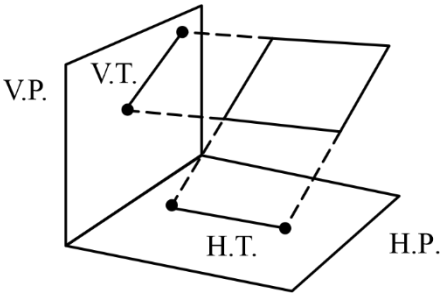
V.T. = Vertical Trace

H.T. = Horizontal trace

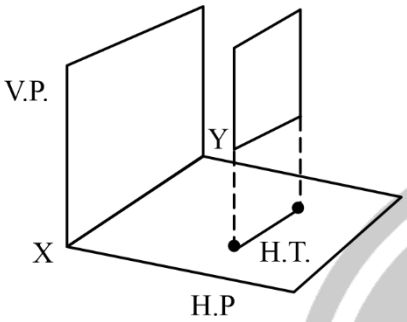
H.P. = Horizontal Plane

V.P. = Vertical Plane

COMMON FOR ALL BRANCHES

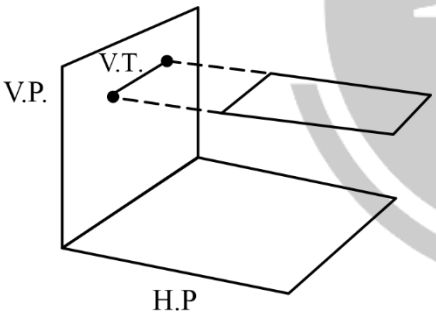


- When a plane is parallel to any of the reference planes, then there will no trace of plane on the reference. Plane to which it is parallel



No. V.T only H.T.

Plane parallel to V.P.



No. H.T only V.T.

Plane parallel to H.P.

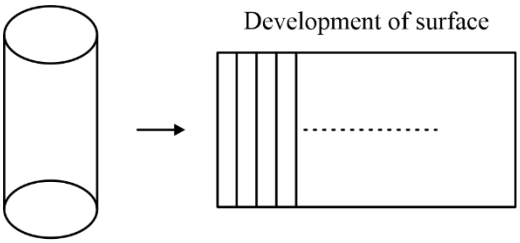
24. (d)

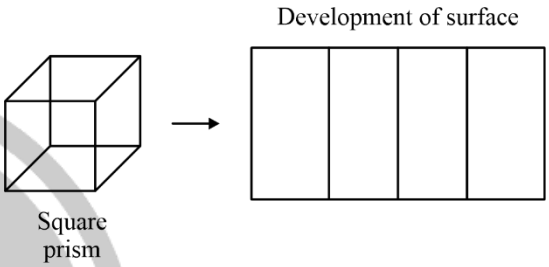
- **Line method:** A number of lines are drawn on the lateral surface of one of the solids and in the region of the line of intersection.
- Points of intersection of these lines with the surface of the other solid are located the curve drawn through these points will be line of intersection.
- **Cutting plane method:** Cutting planes are so selected as to cut the surface of one of the solids in straight lines and that of the other in straight lines or curves.

Box method is used for drawing isometric projection of prims and cylinder by enclosing then in a rectangular box.

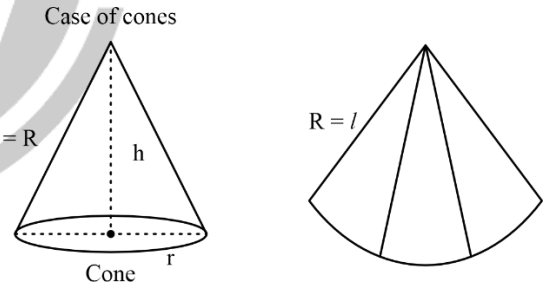
25. (b)

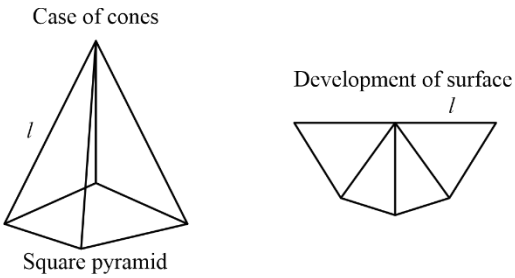
Development of surface of cylinder and prism is done by parallel line method in which edges generation are parallel to each other.





Development of surface of pyramids and cones is done by radial line method in which the slant edges or generator are radial to each other and used as radial (in care of cones)





Development of surface is sector of radius R = & = slant height

Development of surface of sphere is done by approximation method

26. (c)

COMMON FOR ALL BRANCHES

Since 2008, Iceland is the most peaceful nation. It is followed by Denmark, Ireland, Newzealand and Austria, Singapore, Portugal, Slovenia, Japan Switzerland.

Hence, 7 out of top 10 most peaceful nations are from Europe.

27. (b)

Singapore holds the most powerful passport. Japan previously held the top position for five years.

Germany, Italy, Spain share the second position.

28. (d)

All data are correct.

29. (d)

All are correct

30. (b)

Ministry of Defence has signed a contract with Bharat Heavy Electricals Limited (BHEL) on 28 November, 2023 in Haridwar.

31. (a)

Tests suggested by Michoel Davis for ethical decision making

1. Harm Test
2. Publicity Test
3. Defensibility Test
4. Reversibility Test
5. Colleague Test
6. Organization Test
7. Virtue Test

32. (d)

Jeremy Bentham's utilitarianism aims at greatest happiness of the greatest number of people. Which requires a cost-benefit analysis on the basis of the expected consequences of an action.

33. (c)

The fine line between non-negligent and negligent error is called standard of care.

34. (c)

As per black's dictionary, the law treats corporation as a person which can sue or be sued. It means the corporation can file a charge against others or others may file a charge against corporation as per the law.

35. (d)

Blind spot as Dehnis Moberg explains is the information or case in business arena which is not received even though it is obvious due to self deception, Willful blindness and inattentional blindness.

36. (d)

Following are the factors for large scale diversification into unrelated areas by some of the industry conglomerate In India:

(i) Restriction in growth in the existing line of business.

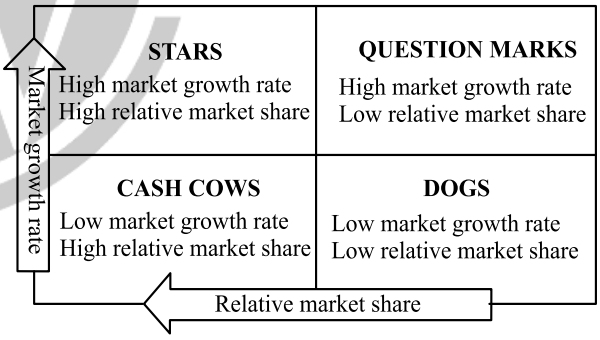
(ii) Opening up newer areas of investments.

(iii) Polities with respect to imports, duties, pricing and reservations are made to support newer areas.

(iv) Desire to avail tax incentives.

37. (c)

The boston consulting group (BCG) matrix is a relatively simple technique for assessing the performance of various segment of the business. The BCG matrix densifies business-unit performance on the basis of the unit's relative market share and Relative market growth rate.



38. (b)

Following are the factors that contribute to decline in unit cost with respect to the accumulated volume of production:

(i) Steep experience or learning curve: Increased experience or learning leads to more efficient production processes through technology Improvement.

(ii) Economies of scale: Present the other essential factor resulting in declining production cast per unit produced.

COMMON FOR ALL BRANCHES

39. (a)

1,2,3

40. (a)

Qualitative methods under demand forecasting are

1. Jury of executive method
2. Collective opinion survey
3. Delphi Method
4. Survey of customers intension, etc.

Quantitative methods under demand forecasting are

1. Simple Average Method.
2. Moving Average Method.
3. Weighted Moving Average Method.
4. Trend projection Method.
5. Chain Ratio Method.
6. Bass diffusion Method.

41. (a)

- National Highway Authority of India and Maha Metro made Guinness World Record in Nagpur for constructing longest Double Decker Viaduct.
- Also, NHAI created another record for longest continuous bituminous lane of 75 km in 105 hours and 33 minutes between Amravati and Akola district in Maharashtra.

42. (a)

IISC's foundation for Science Innovation and Development has launched centre of data for public good. It aims at leveraging data for social good.

43. (d)

- Astrosaf is India's first dedicated space Astronomy observatory launched by PSLV-C30(XL) from Satish Dhawan Space Centre, Sriharikota.

44. (a)

Mahe, Malvan, Mangrol are the first three ships under ASW shallow Water Craft project.

45. (d)

Department of Telecommunication under Meity (Ministry of Electronics and Information Technology) has announced "5G and beyond Hackathon 2023".

46. (d)

Ministry of Home Affairs launched a scheme for Expansion and Modernization of Fire Services in the state.

Fire Service is a state subject.

47. (b)

Nomadic elephant 23 is a bilateral joint military exercise between India and Mongolia.

48. (d)

- The "SPRINT" challenge aimed at giving a boost to the usage of indigenous technology in Indian navy as part of "Azadi Ka Amrit Mahotsov".
- SPRINT refers to supporting pole vaulting in R&D through innovations through Defence Excellence (IDEX), NIIO and Technology Development Acceleration Cell (TDAC)

49. (d)

A centralized receipt and processing centre has been setup at RBI, Chandigarh to process initially physical and mail complaints.

50. (d)

51. (a)

Variance $=\frac{1}{\lambda^2}, E[x]=\frac{1}{\lambda}$ and standard defination $=\frac{1}{\lambda}$

52. (a)

$E_1 \rightarrow$ Result is +ve

$E_2 \rightarrow$ has the disease D

$$P[E_2/E_1]=\frac{P[E_1 \cap E_2]}{P[E_1]}=\frac{P[E_1/E_2]P[E_2]}{P[E_1]}$$

$P[E_1]$ = disease and tested +ve + not the disease

$= 0.001 \times 0.999 + 0.999 \times 0.002$

$P[E_1/E_2] \cdot P[E_2] = 0.001 \times 0.999$

$$P[E_2/E_1]=\frac{0.001\times 0.999}{0.001\times 0.999+0.999\times 0.002}$$

$$=\frac{0.001}{0.003}=\frac{1}{3}$$

53. (d)

54. (a)

COMMON FOR ALL BRANCHES

55. **(b)**

56. **(b)**

57. **(b)**

58. **(a)**

59. **(b)**

60. **(c)**

61. **(d)**

Let diophantus total age = x

$\therefore$ Son died at $= \frac{x}{2}$

Son's age at the time of Diophantus death $= \frac{x}{2} + 4$

Diophantus age before marraige

$= x\left(\frac{1}{6} + \frac{1}{12} + \frac{1}{7}\right) = \frac{33x}{84}$

Left age after marriage $= x - \frac{33x}{84} = \frac{51x}{84}$

Son was born 5 years after marriage

Thus $\frac{x}{2} + 4 + 5 = \frac{51x}{84}$

$\Rightarrow \quad \frac{18 + x}{2} = \frac{51x}{84} \Rightarrow 102x = 1512 + 84x$

$18x = 1512$

$\therefore \quad x = 84$

62. **(a)**

Take any number either 62 or 84

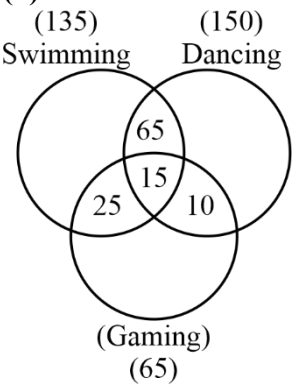
(less then 100 and more than 50)

62 + 83 = 145 OR 84 + 83 = 167

1 + 45 = 46 1 + 67 = 68

62 – 46 = 16 84 – 68 16

63. **(d)**



Total = 240

65 + 25 + 10 = 100

64. **(b)**

H to G to E to J to A to B to F to C to D to E

65. **(c)**

Caramel Center (1) Rank = 0

Vanilla Center (1) Rank = 17

Almond Center (1) Rank = 8

Toffee center (1) Rank = 11 + 9 = 20

Solid Chocolate (1) Rank = 3 + 2 = 5

66. **(b)**

Avalon → 180 + 30 = 210

Branson → 30 + 216 + 26 = 272

Column bus → 244

Dunkirk → 225

67. **(a)**

Arrangement in pile top to bottom

Top

- Sociology
- Education
- Accountancy
- **English**
- **Economics**
- **Psychlogy**
- Hindi

Bottom

68. **(Data In adequante)**

Age (Decreasing Order)	Height (Decreaseing Order)
• Neelam	• Madhavi
• Madhavi = Pranati	• Hasini
• Hasin = Pooja	• Neelam
	• Pooja
	• Pranati

69. **(a)**

Score high to low

High R(IF) S (IF)

V

P

Q

Low T (Then) (Then) U/Q

'V' is fifth means below 'V', these are two members (total seven) i.e., P & Q

$\therefore$ Q is lowest, thus 'S' is highest

70. **(b)**

If number of box = x

Then x = (L.C.M of 3, 4, 5, 6) + 1

But 'x' is also divisible by 7

$\therefore \quad x = 301$

71. **(d)**

72. **(c)**

73. **(b)**

COMMON FOR ALL BRANCHES

74. **(c)**

75. **(d)**

76. **(d)**

77. **(d)**

home, supermarket, credit union, bookstore, home

$11 + 9 + 6 + 7 = 33$

78. **(a)**

Anita $\leftrightarrow$ U.S are Online (NASDAQ)

Tony $\leftrightarrow$ A.S are not Online (New Yourk)

Maria: the utility stock

Jose: the automotive stock

Anita: the technology stock

Tony: the oil stock

79. **(c)**

$\frac{6\times5}{2}=15$

80. **(a)**

$\frac{(2x)^2}{3}-30=18$

$\Rightarrow (2x)^2=144$

$\Rightarrow 2x=12$

$x=6$

81. **(d)**

Malicious software programmes known as rootkits are made to enter a computer system without authorization while aggressively concealing their existence from users and security programmes.

82. **(a)**

An intrusion detection system, often known as an IDS, is a hardware or software instrument that keeps an eye on system and network resources and activities. It looks for unusual or malicious activity that can point to a breach in the security mechanisms of a networked computer environment.

83. **(c)**

The practice entails looking through an individual's online data and other sources for hints about who they are, in order to determine who commented on a discussion forum. This conduct is frequently referred to as "doxing."

84. **(c)**

85. **(a)**

86. **(d)**

Three stage in the development of professional identity are:

1. Independent operator
2. Team-oriented idealist
3. Self-defining or integrated professional

87. **(a)**

Public welfare and safety is the most important fundamental canon of code of ehtics as per NSPE

88. **(c)**

Burnand amadei is the founder of engineers without borders in 2001 in colorado, USA

89. **(c)**

W.D Ross has enumerated list of 7 prima-facie duties

1. Fidelity
2. Reparation
3. Gratitude
4. Non maleficence
5. Justice
6. Beneficence
7. Self-improvement

90. **(b)**

Supererogatory means exceptional moral behaviours more than what is needed.

91. **(d)**

- Infrared (IR) technology is the transmission medium most frequently used for remote control communication for TVs, VCRs, stereos, etc.
- Short-range wireless control is made possible by the remote control's emission of infrared signals, which are picked up by a sensor on the gadget.

92. **(a)**

- The User Datagram Protocol (UDP) is the protocol that encapsulates IP packets with the extra capability of multiplexing and demultiplexing multiple processes with a single IP address.

- In contrast to TCP, UDP does not include error checking or packet resend, nor does it create a connection before sending data. Rather, it depends on the program to take care of these things as needed.
- The terms "multiplexing" and "de-multiplexing" describe UDP's capacity to manage several processes utilizing identical IP addresses and port numbers.d

93. (c)

- A browser extension or plugin module is usually the code module that the browser uses to install itself as an extension after fetching it from a certain directory on the disk.
- Depending on the browser, several technologies can be used to create these extensions. For example, JavaScript, HTML, and CSS can be used to create extensions for Chrome, Firefox, and Edge. Further functionality may be achieved by using browser-specific extension frameworks or APIs.

94. (b)

- In complex websites with numerous pages written by different authors employed by the same business, it's usually preferable to have a method to keep pages from appearing inconsistently.
- This is accomplished with a feature known as a "style guide" or "design system." A style guide offers a collection of standards, directives, and reusable elements for website layout and design. It does this by defining font, colors, spacing, buttons, forms, and other user interface elements, ensuring consistency throughout all pages of the website.
- Regardless of the particular page they are working on, all authors and developers on the website can maintain a uniform design and user experience by following the rules outlined in the style guide. This enhances website usability and contributes to the development of a unified brand identity.

95. (a)

- XML (eXtensible Markup Language) is the language used to create structured web pages for automated processing. XML is a markup language that is very flexible for organising data in a standard manner since it lets users construct their own unique tags.
- It is frequently used to define document structures on the web and to store and convey data. Because XML offers a uniform and comprehensible means of expressing data that is easily interpreted and modified by software, it is especially helpful for automated processing.

96. (d)

- A "CGI interface" (Common Gateway Interface) is the term used to describe the interface that web servers use to communicate with back-end scripts and programmes that may accept input and output HTML pages.
- The CGI standard protocol describes how web servers can interact with third-party applications or scripts to produce dynamic content, like HTML pages, in response to input from users or other parameters. Through the use of this interface, web servers and server-side processing can be integrated, enabling the creation of dynamic content that can be served to clients and the execution of scripts or programmes in response to HTTP requests.

97. (b)

- An internal server problem is indicated by the status code response 500. A 500 Internal Server Error status code is usually sent by a server when an unforeseen circumstance prohibits it from completing the request.
- This status code indicates that the server encountered a problem and was unable to process the request because of an unidentified fault.

98. (d)

Creating a Technology and Information (TI) policy takes care of a number of significant problems about how information and technology

are used in organisations. Let's match the following sentence to each issue:

1. Respect for other people's intellectual property rights, such as trade secrets, copyrights, patents, and trademarks - This is usually addressed to make sure that workers don't do actions that violate other people's intellectual property rights.
2. Inappropriate use of TI resources, including personal emailing, blogging, Web browsing, and other non-business computer use This has to do with making sure that workers don't abuse business resources for personal purposes while they are at work.
3. Maintaining the security of IT resources and preventing unauthorised access by implementing best practices related to password management and access control. This focuses on the need to follow good security practices, such as not sharing user IDs and passwords, using difficult-to-guess passwords, and changing passwords often.
4. The use of the computer to threaten, harass, or degrade other people by sending hurtful emails or using other abusive language - This deals with the issue of making sure that the workplace is polite and free from harassment. It also covers the use of technology sensibly and abstaining from using it to threaten or harass others.

So, all four issues are typically addressed while establishing a TI policy.

99. (b)

The malicious software mentioned is frequently referred to as a "computer virus." A computer virus is a kind of harmful software that attaches itself to other programmes or files and reproduces, spreading to other computers. It frequently spreads by itself and can do so via a variety of channels, such as shared network resources, infected webpages, and email attachments. Viruses can harm computer systems by damaging files, stealing personal data, or interfering with system functions once they are launched.

100. (b)

- A Distributed Denial of Service (DDoS) attack is what is being described. A DDoS assault involves a hostile actor taking control of a compromised computer network, often known as a botnet, and instructing it to overload a target website or online service with traffic.
- The targeted site's regular operations are interfered with by this deluge of traffic, making it unavailable to authorised users. DDoS assaults are frequently used to extort money from businesses, disrupt services, or express opposition to particular laws or practices.

GATE WALLAH

SOLDIERS

THANK YOU