BMT-1/BMW-1/BMV-1
PROVISIONAL ANSWER KEY

Name of the post	**Engineering Aptitude**
Advertisement No.	**51,77,126/2024-25**
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Last Date to Send Suggestion (s)	**16-05-2025**

THE LINK FOR ONLINE OBJECTION SYSTEM WILL START FROM 14-05-2025 ; 10:00 AM ONWARDS

Instructions / સૂચના

Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -

(1) Candidates have to pay fees of Rs.100/- for each objection. The fees can be paid from the link given herewith.

(2) The Candidate will be able to submit objection only after payment of the fees. The generation of the receipt will only be considered as final submission.

(3) The Candidate must retain the receipt of the payment of the fees. The fees, once paid, will not be refunded under any circumstances.

(4) All the objections should be submitted through **ONLINE OBJECTION SUBMISSION SYSTEM** only. Physical or submission through any other means will not be considered.

(5) All objections are to be submitted with reference to the Master Question Paper published with provisional answer key, published herewith on the website / online objection submission system. Objections should be sent referring to the Question No. & options of the Master Question Paper. Objections regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.

(6) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted objections are differed.

(7) Supportive document to the objection must be uploaded, without which objection will not be considered.

ઉમેદવારે નીચેની સૂચનાઓનું પાલન કરવાની તકેદારી રાખવી, અન્યથા વાંધા-સૂચન અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહીં

(1) ઉમેદવારે દરેક વાંધા દીઠ રૂપિયા ૧૦૦/-ફી ભરવાની રહેશે. જે ફી આ સાથે આપેલ લીંક ઉપરથી ભરી શકાશે.

(2) ફી ભર્યા બાદ જ વાંધો સબમીટ થઈ શકશે. ફી ભર્યાની આખરી પહોંચ જ આખરી સબમીશન ગણાશે.

(3) ફી ભર્યાની પહોંચ ઉમેદવારે સાચવી રાખવાની રહેશે. એક વાર ભરેલ ફી કોઈ પણ પરિસ્થિતિમાં પરત આપવામાં આવશે નહિ.

(4) વાંધા ફક્ત **ઓનલાઈન ઓબ્જેકશન સબમીશન સીસ્ટમ** દ્વારા જ સબમીટ કરવાના રહેશે. રૂબરૂ, ટપાલ અથવા ઈ-મેઈલ કે અન્ય કોઈ રીતે આયોગને મોકલવામાં આવેલ વાંધા ધ્યાને લેવામાં આવશે નહીં, જેની ખાસ નોંધ લેવી.

(5) ઉમેદવારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતાં, તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી (માસ્ટર પ્રશ્નપત્ર) ના પ્રશ્નક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા. માસ્ટર પ્રશ્નપત્રમાં નિર્દિષ્ટ પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા ધ્યાને લેવામાં આવશે નહીં.

(6) ઉમેદવારે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદવારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદવારે સૂચવેલ જવાબ અને ઉત્તરવહીનો જવાબ ભિન્ન હશે તો ઉમેદવારે રજૂ કરેલ વાંધા ધ્યાને લેવાશે નહીં.

(7) વાંધા માટે સંદર્ભ જોડવો આવશ્યક છે, જેના વિના વાંધો ધ્યાને લેવામાં આવશે નહીં.

Website link for online objection submission system: https://www.formonline.co.in/GPSC_TRACK/SearchPage.aspx

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1. **Which of the following statement(s) is/are true regarding considering the Noise Pollution (Regulation and Control) Rules, 2000?**

   (i) The State Government shall categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas

   (ii) An area comprising not less than 1000 meters around hospitals, educational institutions and courts may be declared as silence area/zone for the purpose of these rules

   (A) Only (i) **(B) Only (ii)**

   (C) Both (i) and (ii) **(D) Neither (i) nor (ii)**

2. **According to the Noise Pollution (Regulation and Control) Rules, 2000, during which hours may the State Government permit the use of loud speakers or public address systems on festive occasions?**

   (A) 8:00 p.m. to 10:00 p.m.

   (B) 10:00 p.m. to 12:00 midnight

   (C) 12:00 midnight to 2:00 a.m.

   (D) 9:00 p.m. to 11:00 p.m.

3. **Which of the following restriction(s) on the use of horns, sound emitting construction equipments and bursting of crackers is/are correct for controlling the noise pollution?**

   (i) No horn shall be used in silence zones or during night time in residential areas except during a public emergency

   (ii) Sound emitting construction equipments shall not be used or operated during night time in industrial areas

   (iii) Sound emitting fire crackers shall not be burst in residential areas

   (A) Only (i) **(B) (i) and (ii)**

   (C) (ii) and (iii) **(D) (i), (ii) and (iii)**

4. **Which of the following statement(s) is/are true?**

   (i) Under the plan scheme "Metropolitan Advisories for Cities for Sports, Tourism (Metropolitan Air Quality and Weather Services)" Ministry of Earth Sciences (MoES), Govt. of India, has introduced a major national initiative, "System of Air Quality and Weather Forecasting and Research" known as "SAFAR" for greater metropolitan cities of India

   (ii) It mandates to provide location, specific information on air quality in near real time and forecast 1-3 days in advance

   (iii) Indian Institute of Tropical Meteorological, Pune is the nodal agency for SAFAR

   (A) Only (i) **(B) (i) and (ii)**

   (C) (i) and (iii) **(D) (i), (ii) and (iii)**

5. If the Air Quality Index (AQI) is in the range of 201-300, then it is categorized as

(A) Satisfactory
(B) Moderate
(C) Poor
(D) Very poor

6. Electrostatic precipitators are suitable for removing

(i) Fly ash from coal combustion

(ii) Cement dust

(iii) Sulfur dioxide gas

(A) Only (i)
(B) (i) and (ii)
(C) (ii) and (iii)
(D) (i), (ii) and (iii)

7. Out of the seven oxides of Nitrogen (N_2O, NO, NO_2, NO_3, N_2O_3, N_2O_4, N_2O_5) which are associated with combustion and are classified as pollutants?

(A) NO, NO_2
(B) N_2O, NO, NO_2, NO_3
(C) N_2O_3, N_2O_4, N_2O_5
(D) NO_3, N_2O_3, N_2O_4

8. Which of the following statement(s) is/are true regarding Terms of Reference (ToR) in Environmental Impact Assessment (EIA) study?

(i) ToR is a document produced by the authority conducting the EIA study.

(ii) It is formed during Scoping, the second stage in the EIA process.

(iii) All the stakeholders are invited to submit their concerns regarding the project during a public hearing organized by the EIA committee, which is followed by discussions and deliberations.

(iv) The finalized list of this stage of EIA is submitted to the Ministry in the form of ToR.

(A) Only (i)
(B) (i) and (ii)
(C) (iii) and (iv)
(D) (i), (ii), (iii) and (iv)

9. In which of the cases, Environmental Impact Assessment (EIA) clearance is required?

(i) Building construction projects ($\geq$ 15,000 m^2)

(ii) Township and area development projects ($\geq$ 50 ha)

(A) Only (i)
(B) Only (ii)
(C) Both (i) and (ii)
(D) Neither (i) nor (ii)

10. In Terms of Reference (ToR) for Environmental Impact Assessment of building construction and township and area development projects, which of the following is/are the theme(s) of assessing the impact on 'Water Environment'?

(i) Impact of water withdrawal on surface water

(ii) Impact on ground water potential

(iii) Wastewater generation

(A) Only (i)

(B) (i) and (ii)

(C) (ii) and (iii)

(D) (i), (ii) and (iii)

11. According to India's Solid Waste Management (SWM) Rules, 2016, non-recyclable waste with a calorific value of _____ kcal/kg or higher should be used to generate energy through Waste to Energy (WTE) processes.

(A) 500 (B) 1500

(C) 2500 (D) 3500

12. What is the primary purpose of biomining in the closure of old dumps?

(A) To use the stabilized matter as organic manure

(B) To reduce the volume of waste before capping

(C) To prevent groundwater contamination by removing the toxic material

(D) To extract valuable material from the waste

13. Which of the following parameters are used to categorize the river stretches as critically polluted, severely polluted, moderately polluted, less polluted or good?

(i) Biological Oxygen Demand

(ii) Fecal Coliform

(iii) Chemical Oxygen Demand

(iv) Turbidity

(A) (i) and (ii)

(B) (i) and (iii)

(C) (i), (ii) and (iii)

(D) (i), (ii), (iii) and (iv)

14. Under Extended Producer Responsibility (EPR), producers are responsible for

(i) Designing products for easier recycling

(ii) Collecting and disposing of post-consumer waste

Which of the following statement(s) is/are true?

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

15. Which principle is closely aligned with Extended Producer Responsibility (EPR)?

(A) "Polluter Pays" Principle

(B) "Precautionary" Principle

(C) "Common but Differentiated Responsibilities"

(D) "Absolute Liability" Principle

16. Which of the following statement(s) is/are true?

(i) Flame photometry is good only for elements that are easily excited and do not require very high temperatures

(ii) Na, K, Li and Ca are the most widely determined atoms by this technique

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

17. Which of the following is/are the correct permissible limit(s) for organic compost?

(i) Arsenic : 10 mg/kg

(ii) Copper : 300 mg/kg

(iii) Zinc : 1000 mg/kg

(A) Only (i)

(B) (i) and (ii)

(C) (ii) and (iii)

(D) (i), (ii) and (iii)

18. What is the theme of World Meteorological Day, 2025?

(A) Early Warnings for All

(B) Closing the Early Warning Gap Together

(C) Climate Action Now

(D) At the Frontline of Climate Action

19. In climate science, what is 'tipping point'?

(A) It is a critical threshold that when crossed leads to large, accelerating and often irreversible changes in the climate system

(B) It is the moment when the emission reach their peak

(C) It is a temporary pause in global warming due to natural variability

(D) It is the peak of the planet's inherent temperature fluctuations, beyond which a gradual cooling phase ensues as part of its cyclical climatic rhythm

20. What is the primary cause of ocean acidification?

(A) Sulfur dioxide (SO_2) emissions from industrial factories cause acid rain over the oceans

(B) Agricultural runoff release nitric acid into oceans

(C) Increased carbon dioxide (CO_2) is absorbed by seawater

(D) Plastic waste in the oceans breaks down into microplastics

21. A cylindrical rod is subjected to an uniaxial tensile load. Which of the following statements regarding the rod's material behavior is correct if it is made of a linearly elastic, isotropic material?

(A) The ratio of lateral strain to longitudinal strain depends only on the applied stress.

(B) The Poisson's ratio is independent of the material properties.

(C) The modulus of elasticity and shear modulus are related by the Poisson's ratio.

(D) The strain energy density depends only on the longitudinal strain.

22. A material exhibits both time-dependent and temperature-dependent deformation under a constant load. Which of the following is the most appropriate description of this behavior?

(A) Plastic deformation

(B) Elastic deformation

(C) Creep

(D) Fatigue

23. Which of the following materials has a negative coefficient of thermal expansion over a certain temperature range?

(A) Polymers

(B) Quartz

(C) Invar alloy

(D) Zirconium tungstate

24. In a metallic bond, the free electrons that are responsible for electrical conductivity originate from

(A) The innermost electron shells.

(B) The valence electron cloud.

(C) The interstitial spaces between atoms.

(D) The covalent bond formation.

25. The Hall-Petch relationship is used to describe the dependence of yield strength on

(A) Grain size.

(B) Temperature.

(C) Dislocation density.

(D) Applied stress.

26. For a reinforced concrete structure, subjected to freezing and thawing cycles, the most critical property of the aggregate is

(A) Specific gravity

(B) Water absorption

(C) Thermal conductivity

(D) Bulk density

27. The fatigue strength of a material is most significantly affected by

(A) Chemical composition of the material.

(B) Surface roughness and residual stresses.

(C) Young's modulus.

(D) Thermal conductivity.

28. The hardness of a material is least influenced by

(A) Grain size of the material.

(B) Type of heat treatment performed.

(C) Amount of alloying elements present.

(D) Density of the material.

29. In the case of hot-rolled steel, residual stresses are primarily caused by

(A) High strain rate deformation.

(B) Inhomogeneous cooling.

(C) Chemical segregation during casting.

(D) Poor surface finish.

30. For a soil sample tested under uniaxial compression, the failure occurs at an angle of $45° + \phi/2$, where ϕ is the internal angle of friction. This failure corresponds to

(A) Von Mises criterion.

(B) Tresca criterion.

(C) Mohr-Coulomb failure criterion.

(D) Drucker-Prager criterion.

31. Which technology is used for ICT-based real-time monitoring of engineering projects?

(A) Supervisory control and data acquisition

(B) Blockchain

(C) Artificial intelligence

(D) None of the above

32. Which protocol is widely used for secure communication in e-governance applications?

(A) Hypertext Transfer Protocol (HTTP)

(B) Hypertext Transfer Protocol Secure (HTTPS)

(C) File Transfer Protocol (FTP)

(D) Simple Mail Transfer Protocol (SMTP)

33. Which consensus algorithm is commonly used in blockchain networks like bitcoin?

(A) Proof of Work (PoW)

(B) Proof of Stake (PoS)

(C) Proof of Authority (PoA)

(D) Proof of Concept (PoC)

34. What is the primary function of Big Data Analytics in ICT-based education for engineering?

(A) Personalizing learning experiences based on student data

(B) Tracking student attendance in real time

(C) Automating content creation for courses

(D) Simplifying administrative tasks in educational institutions

35. What is the primary advantage of using BIM (Building Information Modelling) in engineering?

(A) Reduced use of Computer-Aided Design tools

(B) Enhanced collaboration across project stakeholders

(C) Exclusive application for architectural design

(D) Replacement of manual construction techniques

36. Which protocol is commonly used for machine-to-machine communication in IoT-based engineering projects?

(A) MQTT (Message Queuing Telemetry Transport)

(B) FTP (File Transfer Protocol)

(C) SMTP (Simple Mail Transfer Protocol)

(D) HTTP (HyperText Transfer Protocol)

37. What is the primary advantage of using blockchain in e-governance systems for engineering projects?

(A) It accelerates project execution by reducing all processes of manual intervention

(B) It eliminates the need for real-time monitoring technologies

(C) It provides secure, immutable and transparent records of transactions and decisions

(D) It replaces traditional engineering methodologies with automated systems

38. In an e-governance system for infrastructure development, which of the following tools can best address delays caused by inaccurate resource planning?

(A) Cloud-based project documentation tools

(B) Big data Analytics platforms integrated with AI algorithms

(C) GPS-based tracking systems

(D) Traditional accounting software for resource allocation

39. What is the role of IoT in predictive maintenance for industrial machinery?

(A) Replacing traditional tools with automation

(B) Monitoring equipment performance in real time to predict failures

(C) Eliminating the need for regular maintenance schedules

(D) Storing physical records of equipment use

40. What does the term “distributed ledger” imply in blockchain?

(A) Data is stored offline

(B) Data is copied and synchronized across multiple locations

(C) Data is stored in a central server

(D) Data can be edited by any participant

41. Find the rank of a matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$

(A) 1 (B) 2

(C) 3 (D) 4

42. The Laplace Transform of $t^2 e^{-4t}$ is

(A) $\frac{2}{s^2+4}$ (B) $\frac{2}{(s^2+4)^2}$

(C) $\frac{2}{(s^2+4)^3}$ (D) $\frac{2}{(s^2+4)^4}$

43. If f(x) is an odd function, its Fourier series in the interval (–c, c) will contain

(A) only cosine terms (B) only sine terms

(C) both sine and cosine terms (D) none of the above

44. If $u = \cos^{-1}\left(\frac{x-y}{x+y}\right)$, then the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is

(A) 1 (B) u

(C) – u (D) 0

45. The value of $\frac{1}{D^2+a^2}\sin(ax)$ is given by

(A) $\frac{x}{2a}\sin(ax)$ (B) $\frac{x}{2a}\cos(ax)$

(C) $-\frac{x}{2a}\cos(ax)$ (D) $-\frac{x}{2a}\sin(ax)$

46. If $V = \frac{x^3y^3}{x^3+y^3}$, then the value of $x\frac{\partial v}{\partial x} + y\frac{\partial v}{\partial y}$ is equal to

(A) $\frac{v}{3}$ (B) 2V

(C) 3V (D) –V

47. The partial differential equation obtained by eliminating the functions f and F from the function $z = f(x + iy) + F(x - iy)$

(A) $\frac{\partial^2 x}{\partial^2 y} + \frac{\partial^2 y}{\partial^2 x} = 0$

(B) $\frac{\partial^2 z}{\partial^2 y} + \frac{\partial^2 z}{\partial^2 x} = 0$

(C) $\frac{\partial^2 z}{\partial^2 y} + \frac{\partial^2 y}{\partial^2 x} = 0$

(D) $\frac{\partial^2 z}{\partial^2 y} + \frac{\partial^2 x}{\partial^2 y} = 0$

48. The maximum value of $\sin\left(x + \frac{\pi}{6}\right) + \cos\left(x + \frac{\pi}{6}\right)$ in the interval $\left(0, \frac{\pi}{2}\right)$ is obtained at

(A) $\frac{\pi}{12}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{3}$

(D) $\frac{\pi}{2}$

49. The function $f(z) = Re(z) = x$. Then

(A) the function satisfies the Cauchy-Riemann differential equations

(B) the function is analytic

(C) the function is not analytic

(D) none of the above

50. The equation $(D^2 - 3D + 2)y = e^x$ has a particular integral

(A) xe^x

(B) $-xe^x$

(C) x^2e^x

(D) None of the above

51. My brother and I played carrom for chocolates, where the loser of each game gave the winner a chocolate. After the final game, I had 20 more chocolates than I initially held, even though my brother won 7 games. Assuming no draws occurred, how many total games did we play?

(A) 27

(B) 34

(C) 37

(D) 41

52. Ram has to buy at least 15 chairs with a budgetary ceiling of Rs 2000. If the chair with arms cost Rs 160 while that of without arms cost Rs 100, then what is the maximum number of chairs with arms Ram can buy?

(A) 6
(B) 8
(C) 10
(D) 12

53. If the average monthly income of Ram and Shyam is Rs 6000, Shyam and Ganesh is Rs 5250 and that of Ram and Ganesh is Rs 5,500, then what is the monthly income of Ram?

(A) Rs 6,500
(B) Rs 6,250
(C) Rs 5,750
(D) Rs 4,850

54. A classroom of 10 students initially has an average weight of 50 kg. Later, when one student left the class, the average weight of the remaining students decreased to 49 kg. Subsequently, a new student joined, increasing the class's average weight to 52 kg. What is the numerical difference between the weight of the student who left and the one who joined?

(A) 15 kg
(B) 20 kg
(C) 25 kg
(D) 27 kg

55. If the ratio of a man's age and his son's age is 7:3 and the product of their ages is 756, then what will be the ratio of their ages after 6 years?

(A) 2:1
(B) 3:1
(C) 3:2
(D) 4:3

56. If $\log_2 [\log_3(\log_2 x)] = 1$, then what will be the value of x?

(A) 1
(B) 3
(C) 9
(D) 27

57. The logarithm of 0.00001 to the base 0.01 is equal to

(A) 5/2
(B) -2/5
(C) 5
(D) 3

58. Rohan allocates a portion of his monthly income to financial planning. He deposits 10% of his salary into a Provident Fund (PF). From the remaining amount, he saves 30%. The rest of his income is dedicated to essential expenses, with the ratio of his grocery spending to medical expenses being 4:3. If Rohan's expenditure on medicines last month totalled Rs 2,700, then determine his monthly income.

(A) Rs 10,000
(B) Rs 12,000
(C) Rs 15,000
(D) Rs 18,000

59. In an examination, 35% of total students failed in Hindi, 45% failed in English and 20% failed in both. Find the percentage of those who passed in both the subjects.

(A) 80%
(B) 60%
(C) 40%
(D) 20%

60. Sita purchased a smartphone but had to sell it for Rs 1,950, incurring a 25% loss on her investment. Determined to recover her finances, she now aims to sell a similar device at a 30% profit. What should be the new selling price to achieve her profit goal?

(A) 3580
(B) 3380
(C) 3180
(D) 2980

61. Which of the following is not a SI unit?

(A) Liter
(B) Kelvin
(C) Meter
(D) Second

62. Komal purchased an instrument with an additional 10% discount on the reduced price after deducting 20% on the MRP. If the MRP was Rs 1400, then at what price did she purchase the instrument?

(A) Rs 988
(B) Rs 1008
(C) Rs 1118
(D) Rs 1218

63. The ratio of the number of boys to the number of girls in a school of 640 students is 5:3. If 30 more girls are admitted in the school, then how many more boys should be admitted so that the ratio of boys to that of the girls become 14:9?

(A) 10
(B) 20
(C) 30
(D) 40

64. Sita works in her office for 6 hours, while Kajal works for 7 hours and 30 minutes. Calculate the ratio of their working hours.

(A) 3:5 (B) 5:4

(C) 4:5 (D) 6:7.5

65. Manish, Jay and Tejas form a partnership with varying investment amounts and durations:

• Manish invests a certain amount at the beginning of the year.

• Jay invests double that amount after 6 months.

• Tejas invests three times Manish's initial investment after 8 months.

If at the end of the year, the partnership earns a profit of Rs 45,000, then Tejas's share of the profit will be

(A) Rs 10,000 (B) Rs 15,000

(C) Rs 18,000 (D) None of the above

66. A man travels from point A to point B at a speed of 4 km/h and returns from point B to point A at 6 km/h. Determine the ratio of the time taken for the journey from A to B compared to the return journey from B to A.

(A) 2:3 (B) 3:2

(C) 4:9 (D) 9:4

67. Garima's father picks her up from college every day after classes conclude at 4 PM. One day, classes end an hour earlier, at 3 PM. Unaware of this change, her father departs at his usual time. Meanwhile, Garima begins walking home immediately after classes end. Her father meets her en route, picks her up, and they arrive home 15 minutes earlier than usual. Determine the ratio of her father's driving speed to Garima's walking speed.

(A) 6:1 (B) 7:1

(C) 10:1 (D) 12:1

68. A rower moves at 3 km/hr in still water. He takes twice the time to cover 50 km upstream as he does to cover the same distance downstream. Determine the speed of the stream.

(A) 0.5 km/hr (B) 1.0 km/hr

(C) 2.0 km/hr (D) 3.0 km/hr

69. A train is travelling at a speed of 132 km/h. If the train is 110 meters long, then how much time will it take to pass a platform that is 165 meters long?

(A) 5.0 seconds
(B) 6.0 seconds
(C) 7.5 seconds
(D) 9.0 seconds

70. Vessels A and B contain mixtures of milk and water in ratios 4:3 and 2:3 respectively. In what proportion should the contents of these two vessels be combined to create a new mixture in vessel C that consists of equal parts of milk and water?

(A) 2:3
(B) 3:4
(C) 5:4
(D) 7:5

71. A square has a perimeter of 56 cm. Two semicircles are inscribed within the square, each having its diameter equal to the side length of the square. Determine the combined area of these two semicircles.

(A) 98π
(B) 49π
(C) $49(\pi/2)$
(D) $49(\pi/4)$

72. Find the number of bricks, each measuring 19 cm × 9 cm × 9 cm with 1 cm thick mortar all around, required constructing a wall of 20 m long, 8 m high and 60 cm thick.

(A) 12,000
(B) 24,000
(C) 36,000
(D) 48,000

73. The calendar for the year 2009 will be the same as that of the year

(A) 2013
(B) 2014
(C) 2015
(D) 2016

74. If second Saturday and Sunday of every month is a holiday, then the total number of working days in a month of 31 days beginning with Wednesday will be

(A) 23
(B) 24
(C) 25
(D) 26

75. In how many ways can 6 players be seated in a circular order?

(A) 720

(B) 120

(C) 60

(D) 30

76. Match the following quality dimensions with their correct descriptions:

1. Performance	a. Expected product life
2. Aesthetics	b. Consistency of performance, probability product will operate over time
3. Reliability	c. Basic characteristics of product/service
4. Durability	d. Appearance, feel, sound, smell, taste

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

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

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

(D) 1 - b, 2 - a, 3 - c, 4 – d

77. Which tool is commonly used in Kaizen to identify and eliminate waste?

(A) SWOT Analysis

(B) 5S Framework

(C) Pareto Chart

(D) Gantt Chart

78. Fishbone diagrams are basically used for

(A) Problem identification

(B) Problem analysis

(C) Quality engineering

(D) Quality assurance

79. Robustness of a product means

(A) Life of the product

(B) Mean time to failure

(C) Intended performance of a product or service

(D) Design that can resist failure or reduction in performance in the face of variations

80. Internal audits are used to verify whether

(i) Products conform to the technical specifications

(ii) Quality management systems are effectively implemented

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

81. In India, which of the following sectors have well-defined Occupational Safety and Health (OSH) regulations?

(A) Mining, Factories, Ports and Agriculture

(B) Factories, Mining, Agriculture and Construction

(C) Mining, Factories, Ports and Construction

(D) Factories, Ports, Agriculture and Construction

82. What is the objective of ISO 9000 family of quality management?

(A) Customer satisfaction

(B) Employee satisfaction

(C) Skill enhancement

(D) Environmental issues

83. Six sigma gives a precision of

(A) 95.34%

(B) 99.73%

(C) 99.99%

(D) 68.27%

84. Match the DMAIC phases with their corresponding steps/definitions in six sigma methodology:

1. Define	a. Identify the root causes of defects using statistical analysis
2. Measure	b. Establish the problem statement, goals and customer requirements
3. Analyze	c. Implement solutions and optimize the process for better performance
4. Improve	d. Monitor and sustain improvements using control plans and documents
5. Control	e. Collect data and quantify the current performance of the process

(A) 1 - b, 2 - d, 3 - a, 4 - c, 5 - e

(B) 1 - b, 2 - e, 3 - a, 4 - c, 5 - d

(C) 1 - c, 2 - a, 3 - d, 4 - b, 5 - e

(D) 1 - a, 2 - c, 3 - b, 4 - e, 5 - d

85. Match the List-I with List-II and select the correct answer using the codes given below the lists.

List-I	List-II
1. Fineness of cement	a. Le-Chatelier apparatus
2. Setting time	b. Vicat's needle
3. Soundness	c. Air permeability apparatus
4. Workability	d. Slump cone

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

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

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

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

86. According to the Indian Standards Specifications, concrete should be cured under a humidity of

(A) 90%

(B) 80%

(C) 70%

(D) 60%

87. The most significant period of reliability prediction by exponential distribution in the bathtub curve is

(A) Infant mortality

(B) Useful life

(C) Wear–out life

(D) Maintenance period

88. Ultrasonic Pulse Velocity method in non-destructive testing for concrete is used to determine:

(i) Compressive strength

(ii) Existence voids

(iii) Dynamic modulus of concrete

(iv) Tensile strength

(v) Static modulus of concrete

(A) (i) and (ii)

(B) (i), (ii) and (iii)

(C) (iv) and (v)

(D) (i), (ii), (iii), (iv) and (v)

89. The time elapsed between the placing of an order and its arrival is called

(A) Cycle time

(B) Lead time

(C) Work station time

(D) Transition time

90. Match the 5S phases with their correct description

5S Phase	Description
1. Seiri (Sorting)	a. Keeping the work area clean and restoring everything to its place at the end of the each shift.
2. Seiton (Set in order)	b. Maintaining and reviewing standards.
3. Seiso (Shining)	c. Going through tools and materials, keeping only essential items.
4. Seiketsu (Standardizing)	d. Ensuring tools and parts are arranged efficiently for workflow.
5. Shitsuke (Sustaining)	e. Defining responsibilities to maintain the first three steps.

(A) 1 - c, 2 - d, 3 - a, 4 - e, 5 - b

(B) 1 - a, 2 - c, 3 - d, 4 - b, 5 - e

(C) 1 - c, 2 - a, 3 - d, 4 - b, 5 - e

(D) 1 - d, 2 - c, 3 - a, 4 - e, 5 - b

91. The two recommended systems of placing the dimensions are

(A) unidirectional and aligned systems

(B) upright and inclined systems

(C) linear and oblique systems

(D) linear and inclined systems

92. The object we see in our surroundings usually without drawing come under which projection?

(A) Perspective projection

(B) Isometric projection

(C) Oblique projection

(D) Orthogonal projection

93. Which of the following method(s) is/are used for determining weightage factors (Weights assigned to criteria in decision-making)?

(i) Analytic Hierarchy Process (AHP)

(ii) Delphi Technique

(iii) Entropy Method

(A) Only (i)

(B) (i) and (ii)

(C) (ii) and (iii)

(D) (i), (ii) and (iii)

94. Which of the following pencil lead is the hardest?

(A) H

(B) HB

(C) B

(D) F

95. When dimensions are specified from a common origin and spaced parallel to one another, it is called as ____

(A) Progressive dimensioning

(B) Chain dimensioning

(C) Superimposed running dimensioning

(D) Coordinate dimensioning

96. As a project manager, you are calculating the timeline for a critical construction activity. Your team has provided three duration estimates: Optimistic duration: 12 days, Pessimistic duration: 22 days and most likely duration: 14 days. What is the expected duration for this activity?

(A) 15

(B) 16

(C) 17

(D) 18

97. Which of the following statement(s) is/are true?

(i) The duration along the critical path defines the shortest possible time required to complete a project

(ii) The critical path is the longest sequence of dependent tasks in a project, and its total duration determines the project's minimum completion time

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

98. Which of the following statement(s) is/are true?

(i) Slack denotes the flexibility range within which an event can occur.

(ii) In the critical path, the slack must be zero

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

99. Which of the following statement(s) is/are true for resource levelling?

(i) The project completion time is not extended even though there is a constraint in the availability of resources

(ii) Start of the non-critical activities is delayed

(A) Only (i)

(B) Only (ii)

(C) Both (i) and (ii)

(D) Neither (i) nor (ii)

100. At 9:30, the hour hand and minute hand of the clock will form an angle of

(A) 90°

(B) 105°

(C) 115°

(D) 120°