62/25

Question Booklet Alpha Code

A

Question Booklet Sl. No.

A

Total Number of Questions : 100 **Time : 90 Minutes**

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C** & **D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

A

1. A thin plate subjected to stress in x, y and z directions are σ_x = 15 MPa, σ_y = 25 MPa and σ_z = 0 and Poisson's ratio is 0.3. The Youngs modulus of the material is 200×10^3 MPa. Then strain in z direction, ε_z is
   A) -60×10^{-6} B) 120×10^{-6}
   C) -120×10^{-6} D) 0.0

2. The stress developed in the bar of 100 mm length which is rigidly supported at both ends, due to rise in temperature of 10°C is (consider Young's modulus of the material as 2×10^5 MPa and coefficient of linear thermal expansion as 10×10^{-6} per °C)
   A) 24 MPa B) 5 MPa
   C) 20 MPa D) 10 MPa

3. A bar in simple tension test is subjected to normal stress of 150 MPa. The maximum shear stress developed in the bar is
   A) 150 MPa B) 0 MPa
   C) 50 MPa D) 75 MPa

4. A simply supported beam A – B of span L is subjected to linearly varying load of intensity zero at end A and maximum value of intensity w at the other end B. The maximum bending moment in this beam occurs
   A) at $\frac{L}{\sqrt{3}}$ from A B) at $\frac{L}{3}$ from A
   C) at $\frac{3L}{2}$ from A D) at $\frac{L}{2}$

5. The rate of change of shear force at any section on the of the beam is equal to
   A) Bending moment at the same section
   B) Slope at the same section
   C) Negative of intensity of distributed load at the same section
   D) Deflection at the same section

6. For a given shear force, shear stress is maximum in symmetrical I section
   A) At the extreme fibres
   B) At centroidal axis
   C) At the junction of the flange and web, but on the web
   D) At the junction of the flange and web, but on the flange

7. The maximum shear stress in a circular section of area A due to shear force F is
   A) $\frac{2F}{3A}$ B) $\frac{3F}{2A}$
   C) $\frac{3F}{4A}$ D) $\frac{4F}{3A}$

8. The maximum flexural stress developed in a simply supported beam of width B, depth D and span L subjected to concentrated load W at L/4 from one end is

A) $\frac{9\,WL}{8\,BD^2}$ B) $\frac{8\,WL}{9\,BD^2}$

C) $\frac{3\,WL}{3\,BD^2}$ D) $\frac{3\,WL}{2\,BD^2}$

9. The ratio of the slope of elastic curve at the free end of cantilever beam of length 2L to that of L, with same flexural rigidity EI, carrying uniformly distributed load of intensity w throughout the length is

A) 4 B) 16 C) 0.5 D) 8

10. A prismatic girder of length l which is simply supported at its end is subjected to UDL of w/unit length over its entire span. If it is propped at the centre of the span to neutralize deflection, the resulting net bending moment at the central prop is

A) $\frac{wl^2}{32}$ (hogging) B) $\frac{wl^2}{24}$ (sagging)

C) $\frac{wl^2}{12}$ (hogging) D) $\frac{wl^2}{8}$ (hogging)

11. A surveyor measured the distance between two points on the plan drawn to a scale 1cm = 50 m and the result is 510 m, later he realised that the scale used by him for measurement is 1cm : 100m. What is the true distance between the two points ?

A) 25.5m B) 51 m C) 255 m D) 1020 m

12. A line of levels was run from Bench mark No. 1 of RL 802.5 m to Bench mark No. 2 of RL 804.8 m. The sum of back-sight was 2.5 m and foresight was 0.4 m. What was the closing error ?

A) – 0.2 m B) 0.2 m C) 2.1 m D) – 0.3 m

13. Find the combined correction for curvature and refraction for a distance of 10 km.

A) 6.73 mm B) 6.73 m C) 7.85 m D) 7.85 mm

14. Agonic line passes through the point of

A) Same latitude B) Zero declination

C) Equal declination D) Same departure

15. The magnetic bearing of a line AB was N59° W, what is the true bearing of the line if the declination is 3° W ?

A) 298° B) 304° C) 62° D) 56°

16. When magnetic bearing of sun at noon is 185°. Find magnetic declination.

A) 5°E B) 5°W C) 175° D) 180°

17. The following perpendicular offsets are taken at 30 m intervals from a survey line to an irregular boundary. Calculate the area by Simpsons rule.

    1.80, 2.00, 2.20, 2.00, 1.80.

    A) 204 m^2 B) 244 m^2 C) 200 m^2 D) 240 m^2

18. The super elevation of a transition curve at circular curve is 10 cm. The rate of attaining super elevation is 2cm/sec. Average speed of vehicle is 20m/sec. Find the length of transition curve.

    A) 100 m B) 100 cm C) 50 m D) 50 cm

19. A transition curve of length 100 m joins a circular curve of radius 500 m. What is the value of shift angle turned by the transition curve ?

    A) 0.10 radians B) 0.2 radians
    C) 0.5 radians D) 1.0 radians

20. A series of closely spaced contour lines represents

    A) Uniform slope B) Plane surface
    C) Steep slope D) Gentle slope

21. The Smith's test is used to determine which of the following properties of stone ?

    A) Cushing strength B) Hardness
    C) Moisture content D) Soluble matter

22. Which of the following types of cement is used for canal lining ?

    A) Low heat cement B) Sulphate resisting cement
    C) Quick setting cement D) White cement

23. Modulus of elasticity, in N/mm^2, of an M25 grade concrete should not be less than

    A) 2.5×10^4 B) 2.0×10^4 C) 1.5×10^4 D) 1.8×10^4

24. Which of the following factors does not influence workability ?

    A) Size of aggregate B) Shape of aggregate
    C) Specific gravity of aggregate D) Surface texture of aggregate

25. The minimum depth required for a foundation

    I. is directly proportional to the intensity of loading
    II. is inversely proportional to the intensity of loading
    III. is directly proportional to the density of the soil
    IV. is inversely proportional to the density of soil
    V. depends on the angle of repose

    A) Statements II and III are correct B) Statements I, IV and V are correct
    C) Statements II, III and V are correct D) Statements I and V are correct

26. Identify the correct statements.
    I. PERT deals with a probabilistic network
    II. CPM is event-oriented program
    III. CPM deals with a deterministic network
    IV. In CPM, times are related to cost
    A) Statements I, III and IV are correct
    B) Statements II and IV are correct
    C) Statements I and IV are correct
    D) All are correct

27. Mass Loaded Vinyl is a material used for
    A) Sound proof
    B) Water proof
    C) Thermal proof
    D) Light proof

28. Identify the material used for flooring.
    A) Linoleum
    B) Magnetite
    C) Glass
    D) All the above

29. The bricks used for the corners of the walls of a structure are called
    A) Spalls
    B) Hearting
    C) Quoins
    D) Side

30. The defect of discoloration of timber due to over-maturity is called
    A) Upset
    B) Wet rot
    C) Dry rot
    D) Foxiness

31. When designing column bases, which of the following factors is not typically considered ?
    A) Soil bearing capacity
    B) Column height
    C) Load transfer mechanism
    D) Connection type

32. Grillage foundations are most suitable for
    A) Shallow soil conditions
    B) Heavy concentrated loads
    C) Areas prone to flooding
    D) Light industrial structures

33. Which of the following types of loads is not typically considered in the design of roof trusses ?
    A) Live load
    B) Dead load
    C) Wind load
    D) Thermal expansion load

34. What does the term “effective length” of a column refer to ?
    A) The total height of the column
    B) The length that accounts for the column’s end conditions
    C) The length that the column can carry load
    D) The theoretical length of the material

35. The partial safety factor for loads accounts for
    A) Uncertainties in load estimation
    B) Material defects
    C) Design simplifications
    D) Environmental factors

36. What is the limiting value of maximum strain in concrete before it fails in compression under normal circumstances ?
    A) 0.002
    B) 0.0035
    C) 0.005
    D) 0.007

37. Which of the following factors affects the bond strength between concrete and reinforcing steel ?
    A) Grade of concrete
    B) Diameter of the bars
    C) Surface condition of the bars
    D) All of the above

38. In one-way slabs, reinforcement is primarily provided in
    A) Both directions
    B) The shorter span direction
    C) The longer span direction
    D) Any direction

39. In a cantilever beam, the point of contraflexure occurs where
    A) Bending moment is zero
    B) Shear force is zero
    C) Tension and compression are equal
    D) None of the above

40. In an RCC beam, the design shear strength is affected by
    A) Depth of beam
    B) Width of beam
    C) Concrete grade
    D) All of the above

41. What will be the surface area of the basin for a flow of 2×10^6 litres per day, having a surface loading rate of 10,000 litres/day/m^2 ?
    A) 100
    B) 200
    C) 300
    D) 400

42. For a water treatment plant having a flow rate of 432 m^3/hr, what is the required plan area of type-I settling tank to remove 90% of the particles having a settling velocity of 0.12 cm/sec is
    A) 120 m^2
    B) 111 m^2
    C) 90 m^2
    D) 100 m^2

43. The runoff in cumec by the rational method is defined by
    A) $Q = K \times A \times I \times R$
    B) $Q = (K + A + I) \times R$
    C) $Q = (K + A) \times R$
    D) $Q = A \times I \times R$

44. What is the permissible negative head loss of a rapid sand filter ?
    A) 0.2 – 1 m
    B) 0.1 – 0.5 m
    C) 1.5 – 2.5 m
    D) 0.8 – 1.2 m

45. What is the maximum design flow of sewage in a septic tank ?
    A) 70 liters per person per day
    B) 100 liters per person per day
    C) 30 liters per person per day
    D) 25 liters per person per day

46. Sewage treatment in an oxidation pond is accomplished primarily by
    A) Algal-bacterial symbiosis
    B) Algal-photosynthesis only
    C) Bacterial oxidation only
    D) Chemical oxidation only

47. The ratio of actual evapo-transpiration to potential evapo-transpiration is in the range
    A) 0.0 to 0.4
    B) 0.6 to 0.9
    C) 0.0 to 1.0
    D) 1.0 to 2.0

48. In unit hydrograph, the magnitude of effective rainfall is
    A) 1.5 cm
    B) 1.5 mm
    C) 1.0 cm
    D) 1.0 mm

49. The rain guage used for measuring rain in hilly inaccessible areas is
    A) Tipping bucket rain guage
    B) Weighing bucket rain guage
    C) Natural siphon rain guage
    D) Symon's rain guage

50. A ground water body which is separated from the main ground water by an impermeable layer is
    A) Aquiclude
    B) Aquifuge
    C) Aquitard
    D) Perched aquifer

51. Which urban phenomenon is most directly addressed by the application of cool roofs and permeable pavements in architectural planning ?
    A) Desertification
    B) Urban heat Island effect
    C) Acid rain deposition
    D) Thermal bridging in facades

52. What was the major result of the Earth Summit held in Rio in 1992, which is a daring program of action calling for new strategies to invest in the future to achieve overall sustainable development in the 21st century ?
    A) Montreal Protocol
    B) Kyoto Accords
    C) Agenda 21
    D) Green Climate Fund

53. What was the global significance of the Brundtland report published in 1987 ?
    A) It proposed the first architectural building codes
    B) It set carbon emission limits for cities
    C) It launched the first green building in Japan
    D) It introduced the term sustainable development

54. A building achieves LEED certification primarily by
    A) Following traditional vastu norms
    B) Reducing operational energy and environmental impact
    C) Using indigenous construction materials
    D) Being budget friendly

55. Which statement aligns with the idea of 'life cycle energy' in buildings ?
    A) Energy of people living in a building
    B) Energy for heating and cooling during peak hours
    C) The embodied energy of materials and objects in a building
    D) Total energy from construction to demolition including operation

56. Which building material innovation is most directly linked to Hassan Fathy's architectural ideology in 'Architecture for the Poor' ?
    A) Mud brick vaults using Nubian techniques
    B) Bamboo reinforced ferrocement
    C) Rat Trab bond walls and filler slab roofs
    D) Hollow clay walls and lime mortar

57. According to ECBC 2017, which glazing types is recommended to minimize heat gain and optimize visual comfort in hot climates ?
    A) Clear single-glazed glass
    B) Tempered glass without coating
    C) Double-glazed low-emissivity glass
    D) Frosted patterned glass

58. In GRIHA rating for affordable housing, which of the following earns specific points ?
    A) Use of imported materials
    B) Provision of smart-home automation
    C) Increased parking bay coverage
    D) Efficient use and reuse of water

59. Which of the following design strategies is most essential in disaster resilient housing promoted by CBRI, Roorkee ?
    A) Plinth band and corner reinforcement in masonry
    B) Use of glass curtain walls to resist wind
    C) High-rise stilts with open podiums
    D) Large cantilevered concrete balconies

60. Which of the following best demonstrates integrated sustainability and cost-effectiveness in mass housing developments ?
    A) Use of imported marble finishes and HVAC systems
    B) Application of standardized modular units with passive ventilation
    C) Designing individual facade treatments for each unit
    D) Providing underground basements for all housing units

61. The value that indicates the average rate of heat transfer into a building through the building envelope.
    A) OTTV
    B) MRT
    C) Equivalent warmth
    D) Heat stress index

62. The temperature at which motionless saturated air would induce, in a sedentary worker wearing ordinary indoor clothing, the same sensation of comfort as that induced by the actual conditions of temperature, humidity and air movement.
    A) Optimum temperature
    B) Resultant temperature
    C) Operative temperature
    D) Effective temperature

63. The instrument used for measuring MRT
    A) Thermometer
    B) Hygrometer
    C) Vane anemometer
    D) Globe thermometer

64. The rate of heat transfer that occurs through a unit thickness of material for a unit area subjected to a unit difference in temperature
    A) Thermal conductivity
    B) Heat transfer coefficient
    C) Thermal resistivity
    D) Thermal resistance

65. Which of the following has a high albedo value ?
    A) Snow
    B) Green grass
    C) Fresh asphalt
    D) Open ocean

66. Thermal comfort index developed based on Indian subjects is
    A) PMV
    B) ASHRAE Comfort standard
    C) Psychrometric chart
    D) Tropical summer index

67. Microclimate of a city is generally the climatic condition at
    A) Exactly at ground surface
    B) The first 100m above the ground surface
    C) 1000m above ground surface
    D) 1m above ground surface

68. Grid iron pattern geometry design in city planning was followed by the city plan
    A) Mohenjo-daro
    B) Paris
    C) Tokyo
    D) Amsterdam

69. Mattancherry palace is also called as
    A) Cochin palace
    B) Portugees palace
    C) Dutch palace
    D) Kerala palace

70. The coolest place or the 'Central place' in an Agraharam is named as
    A) Courtyard
    B) Rezhi
    C) Thinnai
    D) Thalam

71. The book 'A New Theory of Urban Design' was authored by
    A) Kevin Lynch
    B) David Harvey
    C) Christopher Alexander
    D) Jane Jacobs

72. Key principles of placemaking in urban design include
    A) People-centred design
    B) Mixed use development
    C) Public participation
    D) All of the above

73. 'Agora' in ancient Greek cities refers to
    A) Public space that served as meeting place for various activities of greek citizens
    B) Temple dedicated to Greek Gods
    C) Highest point in the Greek city that could be easily defended
    D) Inhabited islands of Greece

74. Urban morphology is the study of
    A) The physical form and structure of cities
    B) Relationship between the built environment, social, economic, political and cultural factors
    C) Layout of buildings, street patterns, open spaces etc.
    D) All of the above

75. Core principles of Transit Oriented Development (TOD) are
    A) Walk, cycle, connect, transit, mix, densify, compact and shift
    B) Walk, connect, densify and transit
    C) Walk, cycle, transit, compact and mix
    D) Walk, cycle, connect, mix, compact and shift

76. Circular economy in architecture conservation focuses on
    A) Adaptive reuse of heritage structures
    B) material reuse and recycling
    C) Innovative design for restoration and regeneration of heritage structures
    D) All of the above

77. The non-profit organisation setup to protect and preserve India's living, built and natural hertitage
    A) Archaeological Society of India (ASI)
    B) United Nations Educational, Scientific and Cultural Organisation (UNESCO)
    C) Indian National Trust for Art and Cultural Heritage (INTACH)
    D) Ministry of Culture

78. Which of the following is not involved in the architecture conservation process ?
    A) Documentation
    B) Rehabilitation
    C) Deconstruction
    D) Restoration

79. UNESCO recognises practices, expressions, knowledge and skills passed down through generations as
    A) Intangible cultural heritage
    B) Traditional wisdom
    C) Cultural norm
    D) Societal culture

80. Architecture Conservation directly contributes to which one of the Sustainable Development Goals (SDG's) ?
    A) SDG 9 (Industry, Innovation and Infrastructure)
    B) SDG 11(Sustainable Cities and Human Settlements)
    C) SDG 12 (Responsible Consumption and Production)
    D) SDG 15 (Life on Land)

81. Which of the following is an example of structure-borne noise ?
    A) Traffic noise through an open window
    B) Vibration from a washing machine
    C) Shouting in a corridor
    D) Loud music in an auditorium

82. What is the typical audible frequency range for a healthy human ear ?
    A) 20 – 1000 Hz
    B) 50 – 10,000 Hz
    C) 20 – 20,000 Hz
    D) 10 – 50,000 Hz

83. Which factor does not affect the speed of sound in air ?
    A) Temperature
    B) Humidity
    C) Pressure
    D) Frequency

84. A Noise Criteria (NC) curve is used to evaluate
    A) Sound absorption in a concert hall
    B) Acceptable background noise in offices
    C) Sound reflection in an auditorium
    D) Frequency of sound waves

85. If a room's volume is 200 cu.m. and total absorption is 50sabins, RT60 is
    A) 0.644s
    B) 0.322s
    C) 1.288s
    D) 0.161s

86. Which of the following is true as per Census of India 2011 ?
    A) Growth of urban population is higher than that of rural population
    B) Growth of rural population is higher than that of urban population
    C) Growth of urban and rural population are almost the same
    D) Growth of urban population is lower than the growth of total population

87. From the following descriptions find out which area may not be categorised as urban area ?
    A) 80% of male working population in an area are engaged in non-agricultural pursuits and a density of the area is 400 persons per sq. km
    B) 60% of male working population in an area are engaged in agricultural pursuits and a density of the area is 200 persons per sq. km
    C) 75% of male working population in an area are engaged in non-agricultural pursuits and a density of 800 persons per sq. km
    D) Statutory towns

88. By 2011 which state had a share of 13.5% of urban population ?
    A) Maharashtra
    B) Rajasthan
    C) Tamil Nadu
    D) West Bengal

89. Which of the following is the scope and purpose of a development plan as per URDPFI guidelines ?
    A) To develop vision and provide a policy framework for urban and regional development and further detailing
    B) To identify the region and regional resources for development within which settlement (urban and rural) plan to be prepared and regulated by DPC
    C) To prepare a comprehensive plan for urban areas, peri urban areas under control of development authority/Metropolitan Planning Committee
    D) To detail the sub-city land use plan and integration with urban infrastructure, mobility and services

90. Build Operate Transfer is a type of PPP. It has many variants. Which of the following is not a variant of BOT ?
    A) Design Build Finance Operate
    B) Buy Build Operate
    C) Build Transfer and Operate
    D) Build Own Operate

91. Providing low-income groups with a plot and basic infrastructure such as water, roads and sanitation is called
    A) PMAY
    B) Land pooling
    C) Incremental housing
    D) Site and services

92. Under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013, which of the following officers are not involved in land acquisition and rehabilitation ?
    A) Administrator
    B) Collector
    C) Commissioner
    D) Mayor

93. Design of a community focused on creating a central green space, surrounded by homes, streets and alleys, located on the periphery creating a pedestrian friendly environment was experimented in which of the following plans ?
    A) Pruit Igoe
    B) Aranya
    C) Radburn
    D) East End

94. Which of the following are the characteristics of Magarpetta, Pune ?
    1. IT offices
    2. Land pooling
    3. TOD
    4. Localised waste treatment

    A) 1 and 2 only
    B) 1, 2 and 3 only
    C) 1, 2, 4 only
    D) All the above

95. Which organisation is designated as a New Town Development Authority for Navi Mumbai ?
    A) Town and Country Planning Organisation
    B) City and Industrial Development Corporation
    C) Housing and Urban Development Corporation
    D) Industrial Credit and Investment Corporation

96. Curitiba in Brazil is famous for
    A) The biggest informal settlement
    B) First hyperloop transport in the world
    C) BRTS and pedestrianisation
    D) Urban agriculture

97. Which of the following is not a principle of New Urbanism ?
    A) Walkability
    B) Land use segregation
    C) Quality architecture and urban design
    D) Increased density

98. Which of the following treaty deals with disaster risk reduction ?
    A) The Sendai framework
    B) The Incheon strategy
    C) The Rio declaration
    D) The Beijing declaration

99. Which Sustainable Development Goal aims at making cities and urban settlements inclusive, safe , resilient and sustainable ?
    A) Goal no. 8
    B) Goal no. 9
    C) Goal no. 10
    D) Goal no. 11

100. Who advocated for close observation as the way to discover and work with the relationship among place, work and folk and developed a new approach to regional and town planning based on the integration of people and their livelihood into the environment of the particular place and region they inhabit ?
    A) Ebenezer Howard
    B) Patrick Geddess
    C) Lewis Mumford
    D) Le Corbusier

Space for Rough Work