155/2015

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. The maximum twisting moment a shaft can resist, is the product of the permissible shear stress and :

    (A) Moment of inertia
    (B) Polar moment of inertia
    (C) Polar modulus
    (D) Modulus of rigidly

2. A beam of length L is pinned at both ends and is subjected to a concentrated bending couple of moment M at its centre. The maximum bending moment in the beam is :

    (A) ML/2
    (B) M
    (C) M/3
    (D) M/2

3. In plastic analysis, the shape factor for a triangular section, is :

    (A) 1.5
    (B) 1.34
    (C) 2.34
    (D) 2.5

4. A single rolling load 8 kN rolls along a girder of 15 m span. The absolute maximum bending moment will be :

    (A) 8 kN-m
    (B) 15 kN-m
    (C) 30 kN-m
    (D) 60 kN-m

5. A rectangular beam 250 mm wide, 310 mm effective depth has 3 bars of 12 mm diameter HYSD grade Fe 415 steel bars. Concrete grade is M20. The ultimate moment of resistance of the beam is :

    (A) 35 kN-m
    (B) 40 kN-m
    (C) 45 kN-m
    (D) 55 kN-m

6. A cantilever steel beam of 3m span carries a udl of 10 kN/m inclusive of self weight. The beam comprises of ISMB200@198N/m. Web thickness = 5.4 mm, $I_{xx} = 1696.6 \, cm^4$ and $I_{yy} = 115 \, cm^4$. The maximum bending stress and average shear stresses in Mpa are respectively :

    (A) 66.3 and 55
    (B) 265 and 27.78
    (C) 390.8 and 54
    (D) 132.5 and 27.78

A

3

[P.T.O.]

7. In case of principal axes of a section :

   (A) sum of moment of inertia is zero

   (B) difference of moment inertia is zero

   (C) product of moment of inertia is zero

   (D) none of these

8. In case of a beam of rectangular cross section simply supported over a span L and loaded with a central load W, length of elasto-plastic zone of the plastic hinge is :

   (A) L/2   (B) L/3

   (C) L/4   (D) L/8

9. The degree of static indeterminacy of a rigid-jointed space frame is :

   (A) $m + r - 2j$ (B) $m + r - 3j$

   (C) $3m + r - 3j$ (D) $6m + r - 6j$

10. For stable structures, one of the important properties of flexibility and stiffness matrices is that the elements on the main diagonal

    (i) of a stiffness matrix must be positive

    (ii) of a stiffness matrix must be negative

    (iii) of a flexibility matrix must be positive

    (iv) of a flexibility matrix must be negative

    The correct answer is :

    (A) (i) and (iii)   (B) (ii) and (iii)

    (C) (i) and (iv)   (D) (ii) and (iv)

11. In SPT, the test uses a thick-walled sample tube, with an outside diameter :

    (A) 45 mm   (B) 53 mm

    (C) 55 mm   (D) 50 mm

12. Unconfined compressive strength is given by 120 kN/m², what will be the unconfined shear strength or cohesion?

    (A) 60 kN/m²   (B) 80 kN/m²

    (C) 90 kN/m²   (D) 120 kN/m²

13. If a soil is fully saturated having void ratio 0.67 what will be the porosity?

    (A) 40%   (B) 42%

    (C) 44%   (D) 46%

14. D_{60} is 9.6 mm, D_{30} is 2 mm and D_{10} is 0.16 mm, what is the value of Cc (coefficient of curvature)?

    (A) 2.4   (B) 2.5

    (C) 2.6   (D) 2.7

15. Black cotton soils are :

    (A) Residual Soils   (B) Organic Soils

    (C) Expansive Soils   (D) Ash Soils

16. The minimum value of camber provided for thin bituminous surface hill roads, is :

    (A) 2.2%   (B) 2.5%

    (C) 3%   (D) 3.5%

17. Maximum number of passenger cars that can pass a given point on a road during one hour under the most ideal road way and traffic conditions, is known as :

    (A) Traffic density   (B) Basic capacity of traffic lane

    (C) Possible capacity of traffic lane   (D) All the above

18. The safe stopping sight distance D, may be computed from the equation :

    (A) $D = 0.278Vt + \dfrac{V^2}{254f}$ (B) $D = 0.254Vt + \dfrac{V^2}{278f}$

    (C) $D = 0.254Vt + \dfrac{V^2}{225f}$ (D) $D = 0.225Vt + \dfrac{V^2}{254f}$

19. Extra widening required at a horizontal curve on a single lane hill road of radius 80 m for a design speed of 50 km ph and for a vehicle with wheel base 6.0 m is :

    (A) 0.225 m   (B) 0.589 m

    (C) 1.250 m   (D) None of these

20. Best ballast contains stones varying in size from :

    (A) 1.5 cm to 3 cm   (B) 2.0 cm to 4 cm

    (C) 2.0 cm to 5 cm   (D) 2.5 cm to 6 cm

21. Ryve's formula for flood estimate in cumecs, is :

    (A) $Q = CA^{3/4}$ (B) $Q = CA^{2/3}$

    (C) $Q = CA^{1/2}$ (D) $Q = CA^{1/3}$

22. An inclined circular plate of diameter 2 m lies submerged in a liquid of specific gravity 0.9. The depth of the centroid of plate below the free surface is 1 meter. The hydrostatic pressure on one side of the plate in kN is :

    (A) 277.4   (B) 308.2

    (C) 30.82   (D) 27.74

23. A rectangular open channel carries a flow of 2 m³/sec/m, what is the value of minimum specific energy?

    (A)   0.74 m   (B)   1.11 m

    (C)   1.48 m   (D)   1.85 m

24. A hydraulic model of a spill way is constructed with a scale 1:25. If the prototype discharge is 3125 cumec, then the corresponding discharge for which the model should be tested is :

    (A)   1 cumec   (B)   2 cumec

    (C)   4 cumec   (D)   8 cumec

25. High COD to BOD ratio of an organic pollutant represents :

    (A)   High biodegradability of the pollutant

    (B)   Low biodegradability of the pollutant

    (C)   Presence of free oxygen for aerobic decomposition

    (D)   Presence of Toxic material in the pollutant

26. Which is a secondary air pollutant?

    (A)   Photochemical smog   (B)   Sulphur dioxide

    (C)   Nitrogen dioxide   (D)   Dust particles

27. Isopleth is a line which joins all the points having :

    (A)   Equal depth of evapotranspiration   (B)   Equal depth of evaporation

    (C)   Equal depth of rainfall   (D)   Equal depth of infiltration

28. A flood discharge is to be estimated for design of a bridge across a river. If the designer intends to accept 25% risk that a flood of that or higher magnitude will occur in the next 15 years, the return period that the designer must use in the estimation of flood discharge is :

    (A)   53 years   (B)   45 years

    (C)   68 years   (D)   76 years

29. A waste water sample contains $10^{-5.6}$ mmoles/litre of hydroxyl ions at 25°C. The pH of the sample is :

    (A)   8.6   (B)   8.4

    (C)   5.6   (D)   5.4

30. Faculative bacterias survive in :

    (A)   The presence of oxygen   (B)   The absence of oxygen

    (C)   Both cases (A) and (B)   (D)   Neither (A) nor (B)

31. *ABCD* is a regular parallelogram plot of land whose angle *BAD* is 60°. If the bearing of the line *AB* is 30°, the bearing of *CD*, is :

(A) 90°

(B) 120°

(C) 210°

(D) 270°

32. The radius of a simple circular curve is 300 m and length of its specified chord is 30 m. The degree of the curve is :

(A) 5.73°

(B) 5.37°

(C) 3.57°

(D) 3.75°

33. The difference between the time avail-to do a job and the time required to do the job, is known as :

(A) Event

(B) Float

(C) Duration

(D) Constraint

34. A portion of an embankment having a uniform up-gradient 1 in 500 is circular with radius 1000 m of the centre line. It subtends 180° at the centre. If the height of the bank is 1 m at the lower end, and side slopes 2:1, the earth work involved :

(A) 26,000 m³

(B) 26,500 m³

(C) 27,000 m³

(D) 27,500 m³

35. The brick work is not measured in cu m in case of :

(A) One or more than one brick wall

(B) Brick work in arches

(C) Reinforced brick work

(D) Half brick wall

36. What annual sinking fund at 4.5% must be invested to produce Rs. 1 at the end of 20 years?

(A) 0.0319

(B) 0.05

(C) 0.045

(D) 0.025

37. Under the straight line method of charging depreciation, depreciation :

(A) increases every year

(B) decreases every year

(C) is constant

(D) fluctuate every year

38. Which one of the following helps to identify the objects on the earth surface?

(A) Atmospheric window

(B) Signature

(C) Radiometric error

(D) None of these

39. Which one of the following relationship between the wave length (λ), and frequency and the speed (C) of the electromagnetic wave is correct?

(A) $C = v + \lambda$

(B) $C = \lambda / v$

(C) $C = v\lambda$

(D) $C = 1 / v\lambda$

40. If T_L is the latest allowable event occurrence time, total activity slack(s), is equal to :

    (A) TL – EFT   (B) LST – EST

    (C) LFT – EFT   (D) All the above

41. The Domus in Ancient Rome was :

    (A) A group of buildings for public meetings

    (B) A single family occupation building

    (C) Three storied flats

    (D) A water supply system

42. Which of the following is not an Indus Valley Archeological site?

    (A) Kalibangan   (B) Dholavira

    (C) Lothal   (D) Chanchalguda

43. As per the 2011 census The Urban population in India is ————————— of the total Population :

    (A) 19.81%   (B) 27.82%

    (C) 31.16%   (D) 47.8%

44. Indira Awaz Yojana is a :

    (A) Rural Housing Program   (B) Slum Improvement program

    (C) Middle income Housing Program   (D) A housing program for women

45. Which of the following institutions was established under an act of parliament in 1988?

    (A) Housing and Urban Development Corporation

    (B) Housing Development Finance Corporation

    (C) National Building Organization

    (D) National Housing Bank

46. The National Urban Housing and Habitat policy 2007 indicates that the Housing Shortage is :

    (A) 34.5 lakh units   (B) 44.8 lakh units

    (C) 24.7 million units   (D) 560083 units

47. The city of Ur was situated on the banks of the river :

    (A) Euphrates   (B) Indus

    (C) Nile   (D) Tiber

48. Which of the following is not a post independent planned city?

    (A) Gandhi nagar   (B) Naya Raipur

    (C) Rakhigarh   (D) Chandigarh

49. According to Gideon Sjoberg a city is a community of substantial size and population density that shelters a variety of ——————— including a literate elite.
   - (A) Specialists
   - (B) Non agricultural specialists
   - (C) Technical specialists
   - (D) Labourers

50. 2011 census was the first census where :
   - (A) Slum blocks are delineated in all statutory towns
   - (B) The caste of citizens is recorded
   - (C) Condition of houses is recorded
   - (D) People with special needs identified

51. Which of the following towns do not have a predominant grid iron system of streets?
   - (A) Philadelphia
   - (B) Siena
   - (C) Priene
   - (D) Miletus

52. Which of the following is the first Garden City as per the idea of Ebenezer Howard?
   - (A) Bern
   - (B) Priene
   - (C) Greendale
   - (D) Letchworth

53. Space syntax Laboratory is associated with :
   - (A) Peter Calthorpe
   - (B) David Harvey
   - (C) Lewis Mumford
   - (D) Bill Hillier

54. "Ville Radieuse" was proposed by :
   - (A) Le Corbusier
   - (B) Christopher Alexander
   - (C) Patrick Geddes
   - (D) Jane Jacobs

55. Which of the following books is written by Aldo Rossi?
   - (A) Towards a new urbanism
   - (B) The City Beautiful
   - (C) The architecture of the city
   - (D) Emerging concepts in Urban Design

56. According to Jane Jacobs which of the following will make a street lively :
   - (A) Clear demarcation between the Public and Private space
   - (B) Eyes on the streets
   - (C) Constant use of the sidewalks and the streets
   - (D) All the above

57. The first Integrated District Development Plan (IDDP) in Kerala was prepared for :
   - (A) Thiruvananthapuram
   - (B) Kollam
   - (C) Ernakulam
   - (D) Kannur

58. The 12th schedule of the 74th amendment of constitution deals with :
    (A) Functions of ULBs
    (B) Peoples participation
    (C) Constitution of Municipalities
    (D) Spatial planning process

59. Transit Oriented Development (TOD) has :
    (A) Low density residential areas with cul-de-sacs
    (B) Low density housing zones with Bus Rapid Transit System
    (C) Multi Modal Transit system connecting Single family residential accommodation
    (D) Mixed Use Commercial and Residential areas with access to public transport

60. Which of the following is true about a "Perspective Plan"?
    (A) It is an annual plan for immediate action
    (B) It is a five year plan for phased implementation
    (C) It is a long term plan with vision and policy orientation
    (D) It is a group of project proposals with time frame

61. Which of the following acts was passed by the Indian Parliament in 2013?
    (A) Land Acquisition Act
    (B) Land Acquisition, Resettlement and Rehabilitation Act
    (C) Land Pooling Act
    (D) Urban Land Ceiling Act

62. Which of the following is not true about Transferable Development Rights?
    (A) It can be traded for money
    (B) It can be used for additional FAR in a plot
    (C) It is issued for the lifetime of the owner
    (D) It is a certificate issued to the owner of a property for the land acquired

63. Compact, Pedestrian friendly, Mixed land use development connected to other areas with public transport is proposed in :
    (A) Plug in City
    (B) New Urbanism
    (C) Broadacre city
    (D) Central Business District

64. Which of the following public housing scheme in the US was destroyed due to high crime rate?
    (A) Pruitt Igoe
    (B) Las Vegas
    (C) North End
    (D) Welwyn

65. According to Kevin Lynch which of the following groups of elements contributes to the Image of the City?

    (A) CBD, Magnets, Fringes, Waterfronts, Roads

    (B) Nodes, Edges, Landmarks, Pathways, Districts

    (C) Landform, Urban Space, Generators, Ghettoes

    (D) Urban Mass, Skyline, Vegetation, suburbs

66. Which of the following is the earliest Regional planning exercise in India?

    (A) Damodar Valley Project   (B) Narmada Valley Project

    (C) Polavaram Irrigation Project   (D) Ganga Action Plan

67. Which of the following is true about the Policy for urban street vendors?

    (A) It proposes to ban street vendors

    (B) It proposes to make rehabilitation facilities and shopping malls for street vendors so that they will not hinder traffic flow

    (C) It recognizes the street vendors' right to vend in any public space

    (D) It recognizes the need for regulation by designating restriction free vending, Restricted vending and no vending zones

68. A transition zone around a city where the urban and rural areas meet, mix and sometimes clash is called a :

    (A) Fringe   (B) Satellite town

    (C) Suburb   (D) Ribbon development

69. Which of the following areas is not part of the National Capital Region?

    (A) Faridabad in Haryana   (B) Ghaziabad in Uttar Pradesh

    (C) Gurgaon in Haryana   (D) Gorakhpur in Uttar Pradesh

70. The amount of biologically productive land and sea used by a given population or activity to produce the resources it consumes and to absorb the waste it generates is called the :

    (A) Biological footprint   (B) Ecological footprint

    (C) Carbon footprint   (D) Thermal footprint

71. A biogas plant treats waste by :

    (A) Aerobic digestion   (B) Anaerobic digestion

    (C) Carbon fixation   (D) Calcification

72. Which of the following is the most polluted city in the world in 2014?

    (A) Indore, India   (B) Helsinki, Finland

    (C) Linfen, China   (D) Calgary, Canada

73. A person aggrieved by an order of the National Green Tribunal of India can appeal within 90 days to :

    (A) The concerned High court
    (B) The Supreme Court of India
    (C) The concerned District Court
    (D) The President of India

74. Which of the following is not a rating system for green buildings?

    (A) GRIHA
    (B) LEED
    (C) POSDCORB
    (D) Green Globes

75. Gently used water from bathroom sink, showers, tubs and washing machines which may contain traces of dirt, food, grease etc. is called :

    (A) Grey water
    (B) Brackish water
    (C) Black water
    (D) Hard water

76. The report "Our Common Future" is also known as :

    (A) Rio Declaration
    (B) Kyoto Protocol
    (C) Brundtland Report
    (D) Habitat Agenda

77. A sea level rise of One meter will submerge which of the following countries?

    (A) Japan
    (B) Indonesia
    (C) Maldives
    (D) Java

78. Stepped wells (vavs) are traditional water harvesting and storing technique common in :

    (A) Rajasthan
    (B) Deccan Region
    (C) Israel
    (D) Middle east countries

79. Which of the following description is most suited to Sustainable development?

    (A) Development which does not harm any fellow beings
    (B) Development with equality of all human beings
    (C) Development which does not affect future prospects of present economic activities
    (D) Development which does not harm the development prospects of future generations

80. EI-nino is a phenomenon in which :

    (A) The temperature of the earth's surface goes up
    (B) Earthquake produces Tsunami and thundershowers
    (C) Agricultural crops are produced in excess
    (D) Sea surface temperature increases

81. Which one of the following right was described by Dr. B.R. Ambedkar as 'the heart and soul' of the constitution?
    (A) Right against exploitation
    (B) Right to constitutional remedies
    (C) Right to equality
    (D) Right to property

82. In the absence of both President and the Vice-President who acts as the President :
    (A) Attorney General of India
    (B) Prime Minister of India
    (C) The Chief Minister of India
    (D) Speaker of the Lok Sabha

83. From which constitution India borrowed the idea of 'Fundamental Rights' :
    (A) Constitution of the USA
    (B) Constitution of Canada
    (C) Constitution of the France
    (D) Constitution of the Britain

84. Who was the First Vice-President of SNDP?
    (A) Sree Narayana Guru
    (B) Kumaranasan
    (C) Sivadasa Iyer
    (D) Dr. Palpu

85. Who was the founder of 'Prathyakha Rakha Daiva Sabha'?
    (A) V.K. Gurukkal
    (B) Pandit Karuppan
    (C) Kumara Guru
    (D) Vagbhadananda

86. Who was the founder of 'Samatwa Samajam'?
    (A) Vaikunda Swamikal
    (B) Sahodaran Ayyappan
    (C) Thycaud Ayya
    (D) V.T. Bhattathirippad

87. Which rebellion related to 'Wagan Tragedy'?
    (A) Attingal rebellion
    (B) Channar rebellion
    (C) Pazhassi rebellion
    (D) Malabar rebellion

88. Who was the leader of Guruvayoor Satyagraha?
    (A) T.K. Madhavan
    (B) K. Kelappan
    (C) C. Kesavan
    (D) K.P. Kesava Menon

89. Who conducted 'Savarna Jatha' from vaikom to Thiruvananthapuram?
    (A) Gandhiji
    (B) C.P. Ramaswamy Iyer
    (C) Mannathu Padmanabhan
    (D) N.P. Damodaran

90. Name the institution that is recently formed to replace planning commission :
    (A) NITI Ayog
    (B) National Development Council
    (C) Inter State Council
    (D) National Institute of Planning

91. Who is popularly known as 'Jhansi of Travancore'?

    (A) A.V. Kuttimalu Amma   (B) Lalithambika Antharjanam

    (C) Akkamma Cheriyan   (D) Lalitha Prabhu

92. First women judge in Kerala High Court :

    (A) Anna Chandi   (B) Omana Kunjama

    (C) K.K. Usha   (D) Sujatha Manohar

93. Who was the first chairperson of Kerala Women's Commission?

    (A) K.C. Rosakutty   (B) Sugathakumari

    (C) Lalitha Kumaramangalam   (D) K.R. Gouri Amma

94. Which is the Mahakavyam of Kumaranasan?

    (A) Veena Poovu   (B) Karuna

    (C) Nalini   (D) None of these

95. What is Numismatics?

    (A) Study of Fossils   (B) Study of Coins

    (C) Study of Soils   (D) Study of Caves

96. Who was the founder "Sadhu Jana Paripalana Sangham"?

    (A) Chattampi Swamikal   (B) Dr. Palpu

    (C) A.K. Gopalan   (D) Ayyankali

97. Which was known as 'Magnacarta of Modern Travancore'?

    (A) Upper cloth revolts   (B) Temple Entry Proclamation

    (C) Malayalee Memorial   (D) Ezhava Memorial

98. The first press in Kerala :

    (A) Manorama press   (B) Mathrubhoomi press

    (C) CMS press   (D) Kerala Kaumudi press

99. Which river known as the 'Nile of Kerala'?

    (A) Bharatapuzha   (B) Periyar

    (C) Pumpa   (D) Bhavani

100. The first Chief Minister of Kerala :

    (A) C. Achutha Menon   (B) R. Sankar

    (C) Pattom Thanupillai   (D) E.M.S. Namboothirippad