Assistant Agriculture Engineer Land Use Survey (LUS) in the office of the Research Officer at Shillong, Tura and Jowai under the Department of Agriculture and Farmers' Welfare

Year of Advt: 2025 **Date of Exam: 23-August-2025** 40849

Booklet Serial No.

DO NOT BREAK THE SEAL OF THE BOOKLET UNTIL YOU ARE TOLD TO DO SO

QUESTION BOOKLET

SERIES : I

Subjects : General English, General Knowledge and Civil Engineering

Full Marks : 350 **Time Allowed : 2½ Hours**

Read the following instructions carefully before you begin to answer the questions.

INSTRUCTIONS TO CANDIDATES

1. This Booklet contains 175 questions to be answered in a separate OMR Answer Sheet using Black Ballpoint Pen in the following three Parts :

Part—A : General English	:	**50 questions**
Part—B : General Knowledge	:	**25 questions**
Part—C : Civil Engineering	:	**100 questions**

2. **All** questions are compulsory.
3. You will be supplied the Answer Sheet separately by the Invigilator. You must complete the details of particulars asked for.
4. Answer must be shown by completely blackening the corresponding circle in the Answer Sheet against the relevant question number by Black Ballpoint Pen. OMR Answer Sheet without marking Series shall not be evaluated.

   Example :

   Suppose the following question is asked :

   The Capital of Meghalaya is

   (A) Guwahati

   (B) Kohima

   (C) Shillong

   (D) Delhi

   You will have four alternatives in the Answer Sheet for your response corresponding to each question of the Question Booklet as below :

   Ⓐ Ⓑ Ⓒ Ⓓ

   In the above illustration, if your chosen response is alternative (C), i.e., Shillong, then the same should be marked on the Answer Sheet by blackening the relevant circle with a Black Ballpoint Pen only as below :

   Ⓐ Ⓑ ● Ⓓ

   The example shown above is the only correct method of answering.
5. Answer the questions as quickly and as carefully as you can. Some questions may be difficult and others easy. Do not spend too much time on any one question.
6. There will NOT be any negative marking for wrong answers.
7. The Answer Sheet must be handed over to the Invigilator before you leave the Examination Hall.
8. No Rough Work is to be done on the Answer Sheet. Space for Rough Work has been provided in the Question Booklet.

SEAL

PART—A : GENERAL ENGLISH

(*Marks* : 100)

Each question carries **2** marks

Directions **(Q. Nos. 1–10) : Choose the correct sentences.**

1. (i) My heart is too full for words.

(ii) My heart is so full that I am out of words.

(iii) My heart is so full that I cannot speak any words.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

2. (i) The fact is too evident to require proof.

(ii) The fact is so evident that it does not require any proof.

(iii) The fact is too full of evidence to prove it.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

3. (i) My bag is twice as big as yours.

(ii) My bag is double the size of yours.

(iii) My bag is two times heavier than yours.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

4. (i) I finished to eat.

(ii) I have finished eating.

(iii) I am done eating.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

5. (i) I have read the Shakespeare's *King Lear.*

(ii) I have read Shakespeare's *King Lear.*

(iii) I have completed reading Shakespeare's *King Lear.*

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

6. (i) The Principal as well as the staff are going to Mumbai.

(ii) The Principal as well as the staff is going to Mumbai.

(iii) The Principal and the staff are going to Mumbai.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

7. (i) The reason of my silence is due to my illness.

(ii) My silence is due to my illness.

(iii) The reason of my silence is illness.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

8. (i) I have come to a conclusion.

(ii) I have come to a final conclusion.

(iii) I have come to a final decision.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

9. (i) The Headmaster and Secretary consented to the request.

(ii) The Headmaster and the Secretary gave his consent.

(iii) The Headmaster and the Secretary gave their consent.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

10. (i) A little spark kindles great fire.

(ii) A little spark kindles a great fire.

(iii) From a little spark may burst a mighty flame.

(A) i and ii

(B) i and iii

(C) ii and iii

(D) i, ii and iii

Directions **(Q. Nos. 11-20) : Read the following passage and answer the questions given below following the instructions :**

A painter of eminence was once resolved to finish a piece which should please the world. When, therefore, he had drawn a picture in which his utmost skill was exhausted, it was exposed in the public marketplace, with directions at the bottom for every spectator to mark with a brush, which lay nearby, every limb and feature which seemed erroneous. The spectators came, and in general applauded; but each willing to show his talent at criticism, marked whatever he thought proper. At evening, when the painter came, he was mortified to find the whole picture one universal blot—not a single stroke that was not stigmatised with marks of disapprobation. Not satisfied with this trial, the next day he resolved to try them in a different manner, and exposing his picture as before, desired that every spectator would mark those beauties he approved or admired. The people complied, and the artist returning, found his picture replete with the marks of beauty; every stroke that had been yesterday condemned, now received the character of approbation. "Well", cries the painter, "I now find that the best way to please one half of the world is not to mind what the other half says; since what are faults in the eyes of these, shall be by those regarded as beauties".

Choose the correct antonyms of the following :

11. Eminence

(A) Obscurity

(B) Powerless

(C) Useful

(D) Stupid

12. Erroneous

(A) Grand

(B) Clumsy

(C) Inaccurate

(D) Errorless

13. Mortified

(A) Ugly

(B) Pleased

(C) Proud

(D) Sad

14. Disapprobation

(A) Displeased

(B) Approval

(C) Hateworthy

(D) Serious

15. Replete

(A) Full

(B) Defeat

(C) Empty

(D) Ravage

Choose the appropriate meaning of the words given below from the options given in the specific context of the passage.

16. Exhausted

(A) Exceed

(B) Depleted

(C) Manifold

(D) Replenish

17. Applauded

(A) Praised

(B) Criticised

(C) Blight

(D) Judged

18. Stigmatised

(A) Described hatefully

(B) Tormented

(C) Banished

(D) Acclaimed

19. Resolved

(A) Agreed

(B) Dedicated

(C) Rule

(D) Decided

20. Complied

(A) Ignored

(B) Tolerated

(C) Agreed

(D) Differed

Directions **(Q. Nos. 21–35) : Choose the correct options to fill in the blanks.**

21. I am not _____ good terms with him.

(A) of

(B) on

(C) in

(D) by

22. He has been ill _____ morning.

(A) on

(B) since

(C) in

(D) from

23. The scene was horrific : there was debris _____ all around the shipwreck.

(A) floating

(B) shattered

(C) mostly

(D) belonging

24. I have a/an _____ headache.

(A) strong

(B) acute

(C) bad

(D) serious

25. His ability to navigate difficult situations is often seen as a testament _____ his leadership skills.

(A) to

(B) of

(C) through

(D) for

26. I was impressed _____ his decent talk.

(A) with

(B) by

(C) for

(D) about

27. What are you thinking _____?

(A) off

(B) on

(C) for

(D) of

28. A farmer lived _____ the side of a river.

(A) across

(B) in

(C) by

(D) from

29. The _____ of lions was resting calmly.

(A) pride

(B) flock

(C) herd

(D) pack

30. The Council of Ministers functions _____ the Prime Minister.

(A) under

(B) with

(C) beside

(D) according to

31. My house is _____ the highway.

(A) down

(B) under

(C) towards

(D) off

32. He still _____ his involvement in the murder.

(A) refuses

(B) objects

(C) denies

(D) rejects

33. Neither my friend nor I _____ to blame.

(A) is

(B) am

(C) are

(D) were

34. The boat hit the rock and _____.

(A) was drowned

(B) was sunk

(C) drowned

(D) sank

35. Distribute the sweets equally _____ the four children.

(A) between

(B) in

(C) through

(D) among

Directions **(Q. Nos. 36–50) : Choose the correct meaning for the words and phrases given below.**

36. Malevolent

(A) Malicious

(B) Kind

(C) Primitive

(D) Benevolent

37. Grandiose

(A) False

(B) Proud

(C) Magnificent

(D) Ideal

38. Mundane

(A) Commonplace

(B) Practical

(C) Spiritual

(D) Relaxed

39. Altercation

(A) Agreement

(B) Change

(C) Practice

(D) Argument

40. Goad

(A) Pull

(B) Provoke

(C) Restraint

(D) Disgrace

41. Pecuniary

(A) Daily

(B) Fiscal

(C) Physical

(D) Greedy

42. Unkempt

(A) Dishevelled

(B) Neat

(C) Orderly

(D) Grassy

43. Difficult to please

(A) Indifferent

(B) Carefree

(C) Insatiable

(D) Fastidious

44. Worthy of being believed

(A) Credible

(B) Audible

(C) Articulate

(D) Inanimate

45. Speech made for the first time

(A) Speaker

(B) Maiden

(C) Veteran

(D) Novice

46. Present everywhere at the same time

(A) Omniscient

(B) Omnipotent

(C) Optimistic

(D) Omnipresent

47. The act of copying another person's ideas, words or work and pretending they are your own

(A) Copyist

(B) Imitator

(C) Plagiarism

(D) Mimic

48. Walking in sleep

(A) Somniloquism

(B) Hallucination

(C) Obsession

(D) Somnambulism

49. An insect with many legs

(A) Mammal

(B) Herbivorous

(C) Centipede

(D) Vertebrate

50. A person who has no money to pay off debts

(A) Insolvent

(B) Pauper

(C) Beggar

(D) Debtor

PART—B : GENERAL KNOWLEDGE

(*Marks* : 50)

Each question carries **2** marks

51. The Hundred Years' War was a series of conflicts between which two countries?

(A) France and America

(B) France and Germany

(C) France and England

(D) France and Austria

52. The Great Bath was discovered at which site of the Indus Valley Civilization?

(A) Banawali

(B) Lothal

(C) Mohenjo-daro

(D) Harappa

53. Tipu Sultan's father Haidar Ali died during the

(A) First Anglo-Mysore War

(B) Second Anglo-Mysore War

(C) Third Anglo-Mysore War

(D) Fourth Anglo-Mysore War

54. Mariana Trench, the world's deepest trench, is located in the

(A) Atlantic Ocean

(B) Arctic Ocean

(C) Indian Ocean

(D) Pacific Ocean

55. The term used for a day with equal duration of day and night is referred to as

(A) equinox

(B) solstice

(C) perihelion

(D) eclipse

56. What kind of water body is the Sea of Galilee?

(A) Lake

(B) Ocean

(C) Pond

(D) Sea

57. Saffron Revolution is related to

(A) oilseeds

(B) petroleum

(C) horticulture

(D) solar energy

58. The Constitution of India originally consisted of how many Articles?

(A) 295

(B) 305

(C) 345

(D) 395

59. Which one of the following is an indirect tax?

(A) Sales tax

(B) Income tax

(C) Gift tax

(D) Property tax

60. The secondary colour, yellow is produced by mixing which two colours?

(A) Red and blue

(B) Green and red

(C) Blue and green

(D) None of the above

61. Who invented the 'ballpoint pen' ?

(A) Biro brothers

(B) Waterman brothers

(C) Bicc brothers

(D) Wright brothers

62. Which metal is known as 'white gold' ?

(A) Iron

(B) Silver

(C) Platinum

(D) Titanium

63. Which of the following is ***not*** a primary air pollutant?

(A) Hydrocarbons

(B) Carbon monoxide

(C) Ozone

(D) Sulphur dioxide

64. Nokrek in Meghalaya is a

(A) wildlife sanctuary

(B) national park

(C) biosphere reserve

(D) biosphere reserve as well as a national park

65. How many players are there in each side in the game of Kabaddi?

(A) 5

(B) 7

(C) 9

(D) 11

66. Malicious software, designed to harm a computer, is called as

(A) Spyware

(B) Adware

(C) Freeware

(D) Malware

67. Water Lily is the national emblem of which country?

(A) Bangladesh

(B) New Zealand

(C) Norway

(D) Italy

68. In which event did Meghalaya win a gold medal in the 38th National Games, 2025 held in Uttarakhand?

(A) Boxing

(B) Karate

(C) Kayaking

(D) Archery

69. The Winner of the UEFA Nations League, 2025 held in Germany was

(A) Spain

(B) Portugal

(C) Germany

(D) England

70. The police operation to nab the culprits involved in the murder of the Indore-based businessman Raja Raghuvanshi in Sohra was named as

(A) Operation Sindoor

(B) Operation Indore

(C) Operation Honeymoon

(D) Operation Sonam

71. The first OTT Platform dedicated to Meghalaya's culture, landscapes and stories is

(A) 'Hello Meghalaya'

(B) 'Yes Meghalaya'

(C) 'Prime Meghalaya'

(D) 'Invest Meghalaya'

72. The current External Affairs Minister of India is

(A) Rajnath Singh

(B) Amit Shah

(C) Nitin Gadkari

(D) Dr. S. Jaishankar

73. Meghalaya's _____ have been included in the tentative list of UNESCO world heritage sites.

(A) sacred groves

(B) living root bridges

(C) monoliths

(D) wildlife sanctuaries

74. The Best Picture Award winner in the 97th Academy Awards was

(A) *Anora*

(B) *The Brutalist*

(C) *Conclave*

(D) *Wicked*

75. The actor and producer of the movie, *Sitaare Zameen Par* is

(A) Shah Rukh Khan

(B) Aamir Khan

(C) Salman Khan

(D) Ajay Devgan

PART—C : CIVIL ENGINEERING

(*Marks* : 200)

Each question carries **2** marks

76. The ratio of strengths of solid to hollow shafts, both having outside diameter D and the hollow shaft having inside diameter $\frac{D}{2}$, in torsion, is

(A) $\frac{16}{15}$

(B) $\frac{1}{2}$

(C) $\frac{1}{16}$

(D) $\frac{15}{16}$

77. In a loaded beam, the point of contraflexure occurs at a section where

(A) bending moment is minimum

(B) bending moment is zero or changes sign

(C) bending moment is maximum

(D) shearing force is zero

78. The deflection due to couple M at the free end of a cantilever length L is

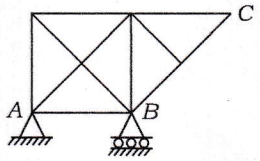
(A) $\frac{ML}{EI}$

(B) $\frac{2ML}{EI}$

(C) $\frac{ML^2}{2EI}$

(D) $\frac{M^2L}{2EI}$

79. The degree of indeterminacy of the frame in the figure below is



(A) 1

(B) 2

(C) 3

(D) zero

80. A shaft turning at 150 r.p.m. is subjected to a torque of 150 kg-m. The horsepower transmitted by the shaft is

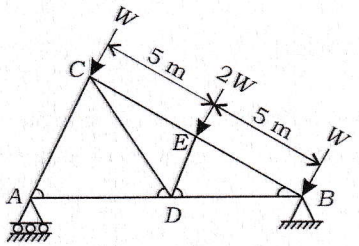
(A) π

(B) 10π

(C) π^2

(D) $\frac{1}{\pi}$

81. The force in DB of the truss shown in the figure below is



(A) $\sqrt{3}\,W$ compression

(B) $\sqrt{W}$ tension

(C) $2W$ compression

(D) $5W$ tension

82. A cantilever beam rectangular in cross-section is subjected to an isolated load at its free end. If the width of the beam is doubled, the deflection of the free end will be changed in the ratio of

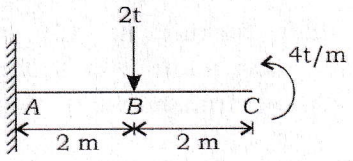
(A) 8

(B) $\frac{1}{8}$

(C) $\frac{1}{2}$

(D) 2

83. The BM of a cantilever beam shown in the figure below at A is



(A) zero

(B) 8 t-m

(C) 12 t-m

(D) 20 t-m

84. When equal and opposite forces applied to a body, tend to elongate it, the stress so produced, is called

(A) shear stress

(B) compressive stress

(C) tensile stress

(D) transverse stress

85. If the normal cross-section A of a member is subjected to tensile force P, the resulting normal stress in an oblique plane inclined at angle θ to transverse plane will be

(A) $\frac{P}{A}\sin^2\theta$

(B) $\frac{P}{A}\cos^2\theta$

(C) $\frac{P}{2A}\sin^2\theta$

(D) $\frac{P}{2A}\cos^2\theta$

86. n and j are numbers of members and joints in a frame. It contains redundant members, if

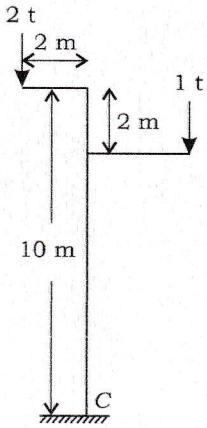
(A) $n = 2j - 3$

(B) $n = 3j - 2$

(C) $n < 2j - 3$

(D) $n > 2j - 3$

87. The bending moment at C of a portal frame shown in the figure below is



(A) 8 t-m

(B) 4 t-m

(C) 28 t-m

(D) zero

88. In plastic analysis, the shape factor for a circular section is

(A) 1·5

(B) 1·6

(C) 1·7

(D) 1·75

89. A load of 1960 N is raised at the end of a steel wire. The minimum diameter of the wire so that stress in the wire does not exceed 100 N/mm^2 is

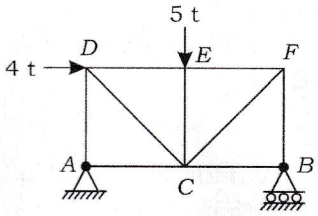
(A) 4·0 mm

(B) 4·5 mm

(C) 5·0 mm

(D) 5·5 mm

90. The force in BF of the truss shown in the figure below is



(A) 4 t tension

(B) 4 t compression

(C) 4·5 t tension

(D) 4·5 t compression

91. The equivalent length of a column of length L, having both the ends hinged, is

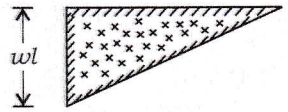
(A) $2L$

(B) L

(C) $3L$

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

92. The SF diagram of a loaded beam shown in the figure given below is that of



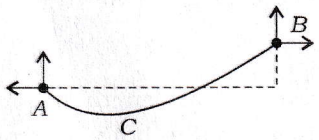
(A) a simply supported beam with isolated central load

(B) a simply supported beam with uniformly distributed load

(C) a cantilever with an isolated load at the free end

(D) a cantilever with a uniformly distributed load

93. In the cable shown in the figure given below, the minimum tension occurs



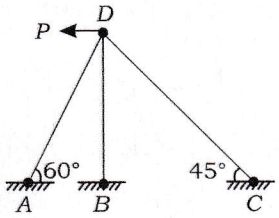
(A) at A

(B) at B

(C) at C

(D) between A and C

94. The degree of indeterminacy of the frame in the figure given below is



(A) zero

(B) 1

(C) 2

(D) 3

95. The minimum value of camber provided for thin bituminous surface hill roads is

(A) 2·2%

(B) 2·5%

(C) 3·0%

(D) 3·5%

96. The total length of a valley formed by two gradients –3% and +2% curve between the two tangent points to provide a rate of change of centrifugal acceleration 0·6 m/sec^2, for a design speed 100 kmph, is

(A) 16·0 m

(B) 42·3 m

(C) 84·6 m

(D) None of the above

97. If the ruling gradient on any highway is 3%, the gradient provided on the curve of 300 metre radius is

(A) 2·00%

(B) 2·25%

(C) 2·50%

(D) 2·75%

98. In water bound macadam roads, binding material is

(A) sand

(B) stone dust

(C) cement

(D) brick dust

99. If R is the radius of a main curve and L is the length of the transition curve, the shift of the curve is

(A) $\frac{L}{24}R$

(B) $\frac{L^2}{24}R$

(C) $\frac{L^3}{24}R$

(D) $\frac{L^4}{24}R$

100. The absolute minimum radius of horizontal curve for a design speed 60 kmph is

(A) 131 m

(B) 210 m

(C) 360 m

(D) None of the above

101. To prevent compressive stresses in a rigid concrete pavement, the joint provided is

(A) expansion joint

(B) contraction joint

(C) hinged joint

(D) All of the above

102. The minimum number of 50-kg cement bags per cubic metre of concrete for a mix corresponding to crushing strength 280 kg/cm^2 at 28 days is

(A) 5·0

(B) 6·5

(C) 7·0

(D) 7·5

103. In a liquid limit test, the moisture content at 10 blows was 70% and that at 100 blows was 20%. The liquid limit of the soil is

(A) 35%

(B) 50%

(C) 65%

(D) None of the above

104. The active earth pressure of a soil is proportional to (where ϕ is the angle of friction of the soil)

(A) $\tan(45° - \phi)$

(B) $\tan^2\left(45° + \frac{\phi}{2}\right)$

(C) $\tan^2\left(45° - \frac{\phi}{2}\right)$

(D) $\tan(45° + \phi)$

105. The lateral earth pressure on a retaining wall is

(A) equal to the mass of the soil retained

(B) proportional to the depth of the soil

(C) proportional to the square of the depth of the soil

(D) proportional to the internal friction of the soil

106. When drainage is permitted under initially applied normal stress only and full primarily consolidation is allowed to take place, the test is known as

(A) quick test

(B) drained test

(C) consolidated undrained test

(D) None of the above

107. The minimum size of the particles of silt soil is

(A) 0·002 mm

(B) 0·04 mm

(C) 0·06 mm

(D) 0·08 mm

108. A flow line makes angles θ_1 and θ_2 with the normal to the interface of the soils having permeabilities k_1, k_2 before and after deflection. According to the law of deflection of the flow lines at the interface of the dissimilar soils

(A) $\frac{\sin\theta_1}{\sin\theta_2} = \frac{k_1}{k_2}$

(B) $\frac{\cos\theta_1}{\cos\theta_2} = \frac{k_1}{k_2}$

(C) $\frac{\tan\theta_1}{\tan\theta_2} = \frac{k_1}{k_2}$

(D) $\frac{\tan\theta_2}{\tan\theta_1} = \frac{k_1}{k_2}$

109. A compacted soil sample using 10% moisture content has a weight of 200 g and mass unit weight of 2·0 g/cm^3. If the specific gravities of soil particles and water are 2·7 and 1·0, the degree of saturation of the soil is

(A) 11·1%

(B) 55·6%

(C) 69·6%

(D) None of the above

110. The coefficient of curvature is defined as

(A) $\frac{D_{60}}{D_{10}}$

(B) $\frac{D_{10}}{D_{60}}$

(C) $\frac{D_{30}^2}{D_{60}D_{10}}$

(D) $\frac{D_{10}^2}{D_{30}D_{60}}$

111. Stokes' law states that the velocity at which a grain settles out of suspension, the other factors remaining constant, is dependent upon

(A) the shape of grain

(B) the weight of grain

(C) the size of grain

(D) All of the above

112. A soil has bulk density 2·30 g/cm^3 and water content 15 per cent, the dry density of the sample is

(A) 1·0 g/cm^3

(B) 1·5 g/cm^3

(C) 2·0 g/cm^3

(D) 2·5 g/cm^3

113. The maximum shear stress occurs on the filament which makes an angle with the horizontal plane is equal to

(A) 30°

(B) 45°

(C) 60°

(D) 90°

114. The equation $\tau = C + \sigma \tan\phi$ is given by

(A) Rankine

(B) Coulomb

(C) Culmann

(D) Mohr

115. According to the Indian Standards, the specific gravity is the ratio of the unit weight of soil solids to that of water at a temperature of

(A) 17 °C

(B) 23 °C

(C) 27 °C

(D) 30 °C

116. The plasticity index is the numerical difference between

(A) liquid limit and plastic limit

(B) plastic limit and shrinkage limit

(C) liquid limit and shrinkage limit

(D) None of the above

117. The phreatic line in an earth dam may be

(A) circular

(B) elliptical

(C) parabolic

(D) a straight line

118. Stokes' law does not hold good if the size of particle is smaller than

(A) 0·0002 mm

(B) 0·002 mm

(C) 0·02 mm

(D) 0·2 mm

119. The maximum area of tension reinforcement in beams shall ***not*** exceed

(A) 0·15%

(B) 1·5%

(C) 4%

(D) 1%

120. The minimum number of main steel bars provided in RCC

(A) rectangular columns is 4

(B) circular columns is 6

(C) octagonal columns is 8

(D) All of the above

121. An RCC beam of 6 m span is 30 cm wide and has a lever arm of 55 cm. If it carries a UDL of 12 t per m and allowable shear stress is 5 kg/cm^2, the beam

(A) is safe in shear

(B) is safe with stirrups

(C) is safe with stirrups and inclined bars

(D) needs revision of section

122. If W is the uniformly distributed load on a circular slab of radius R fixed at its ends, the maximum positive radial moment at its centre is

(A) $\frac{3WR^2}{16}$

(B) $\frac{2WR^2}{16}$

(C) $\frac{WR^2}{16}$

(D) None of the above

123. Lapped splices in tensile reinforcement are generally not used for bars of size larger than

(A) 18 mm diameter

(B) 24 mm diameter

(C) 30 mm diameter

(D) 36 mm diameter

124. The minimum spacing between horizontal parallel reinforcement of the same size should not be less than

(A) 1 diameter

(B) 2·5 diameters

(C) 3 diameters

(D) 3·5 diameters

125. The maximum permissible size of aggregates to be used in casting the ribs of a slab is

(A) 5 mm

(B) 7·5 mm

(C) 10 mm

(D) 15 mm

126. _____ has designated the concrete mixes into a number of grades as M10, M15.

(A) IS 456-2000

(B) IS 456-2010

(C) IS 513-1999

(D) IS 465-2000

127. Side face reinforcement shall be provided in the beam when depth of the web in a beam exceeds

(A) 50 cm

(B) 75 cm

(C) 100 cm

(D) 120 cm

128. The design of a two-way slab simply supported on edges and having no provision to prevent the corners from lifting is made by

(A) Rankine formula

(B) Marcus formula

(C) Rankine-Grashof formula

(D) Grashof formula

129. Maximum compressive strain in concrete in axial compression in limit state of collapse is

(A) 0·002

(B) 0·0002

(C) 0·0035

(D) None of the above

130. Segregation in concrete results in

(A) honeycombing

(B) porous layers

(C) surface scaling

(D) All of the above

131. The function of aggregates in concrete is to serve as

(A) binding material

(B) filler

(C) catalyst

(D) All of the above

132. In the manufacture of cement, the dry or wet mixture of calcareous and argillaceous materials is burnt at a temperature between

(A) 900 °C to 1000 °C

(B) 1000 °C to 1200 °C

(C) 1200 °C to 1500 °C

(D) 1500 °C to 1600 °C

133. Gypsum is added to cement for

(A) providing high strength to the cement

(B) controlling the initial setting time of cement

(C) lowering the clinkering temperature of cement

(D) All of the above

134. The aggregate is said to be flaky when

(A) its least dimension is three-fifth of its mean dimension

(B) its least dimension is equal to its mean dimension

(C) its length is equal to its mean dimension

(D) its length is equal to 1·8 times its mean dimension

135. The workability of concrete by slump test is expressed as

(A) minutes

(B) mm/h

(C) mm^2/h

(D) mm

136. If the atmospheric pressure on the surface of an oil tank (sp. gr. 0·8) is 0·1 kg/cm^2, the pressure at a depth of 2·5 m is

(A) 1 metre of water

(B) 2 metres of water

(C) 3 metres of water

(D) 3·5 metres of water

137. The unit of kinematic viscosity is

(A) m^2 /sec

(B) newton sec/m^2

(C) newton sec/m^3

(D) kg sec/m^2

138. The time of emptying liquid from a hemispherical vessel through an orifice at its bottom, is

(A) $\frac{nR^{3/2}}{15C_d a\sqrt{2g}}$

(B) $\frac{2nR^{3/2}}{15C_d a\sqrt{2g}}$

(C) $\frac{7nR^{3/2}}{15C_d a\sqrt{2g}}$

(D) $\frac{14nR^{3/2}}{15C_d a\sqrt{2g}}$

139. The shear stress distribution in viscous fluid through a circular pipe is

(A) maximum at the centre

(B) maximum at the inside of the surface

(C) same throughout the section

(D) None of the above

140. The side slope of Cipoletti weir is generally kept

(A) 1 to 4

(B) 1 to 3

(C) 1 to 2

(D) 1 to 5

141. An ideal flow of a liquid obeys

(A) continuity equation

(B) Newton's law of viscosity

(C) Newton's second law of motion

(D) dynamic viscosity law

142. The phenomenon occurring in an open channel when a rapidly flowing stream abruptly changes to a slowly flowing stream causing a distinct rise of liquid surface is

(A) water hammer

(B) hydraulic jump

(C) critical discharge

(D) None of the above

143. For the stability of a structure against seepage pressure, according to Khosla's creep theory, the critical gradient is

(A) zero

(B) 0·25

(C) 0·50

(D) 1·00

144. The top of the capillary zone

(A) lies below the water table at every point

(B) lies above the water table at every point

(C) coincides the water table at every point

(D) None of the above

145. For the design of major hydraulic structures on the canals, the method generally preferred to, is based on

(A) Bligh's theory

(B) electrical analogy method

(C) the relaxation method

(D) Khosla's method of independent variables

146. Pick up the correct equation from the following.

(A) Run off = surface run off + groundwater flow

(B) Run off = surface run off − groundwater flow

(C) Run off = surface run off / groundwater flow

(D) Run off = surface run off × groundwater flow

147. The standard height of a standard rain gauge is

(A) 10 cm

(B) 20 cm

(C) 30 cm

(D) 50 cm

148. While calculating the average depth of annual precipitation in a catchment basin, importance to individual rain gauge station is given in

(A) arithmetical method

(B) Thiessen's mean method

(C) isohyetal method

(D) Both (B) and (C)

149. In chain surveying, field work is limited to

(A) linear measurements only

(B) angular measurements only

(C) both linear and angular measurements

(D) None of the above

150. Pick up the method of surveying in which field observations and plotting proceed simultaneously from the following.

(A) Chain surveying

(B) Compass surveying

(C) Plane table surveying

(D) Tacheometric surveying

151. A bearing of a line is also known as

(A) magnetic bearing

(B) true bearing

(C) azimuth

(D) reduced bearing

152. *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°

153. True meridians at different places

(A) converge from the south pole to the north pole

(B) converge from the north pole to the south pole

(C) converge from the equator to the poles

(D) run parallel to each other

154. A tape of length l and weight W kg/m is suspended at its ends with a pull of P kg, the sag correction is

(A) $\frac{l^3W^2}{24P^2}$

(B) $\frac{l^2W^3}{24P^2}$

(C) $\frac{l^2W^2}{24P^3}$

(D) $\frac{lW^2}{24P}$

155. Metric chains are generally available in

(A) 10 m and 20 m length

(B) 15 m and 20 m length

(C) 20 m and 30 m length

(D) 25 m and 100 m length

156. If 2% solution of a sewage sample is incubated for 5 days at 20 °C and depletion of oxygen was found to be 5 p.p.m., BOD of the sewage is

(A) 200 p.p.m.

(B) 225 p.p.m.

(C) 250 p.p.m.

(D) None of the above

157. The most dangerous pollutant in vehicular emissions is

(A) CO

(B) SO_2

(C) CO_2

(D) O_3

158. The detention period for plain sedimentation water tanks is usually

(A) 4 to 8 hours

(B) 8 to 16 hours

(C) 16 to 24 hours

(D) 24 to 36 hours

159. 5-day biochemical oxygen demand (BOD5) is taken at a temperature of

(A) 0 °C

(B) 15 °C

(C) 20 °C

(D) 25 °C

160. In slow sand filters, the turbidity of raw water can be removed only up to

(A) 60 mg/litre

(B) 75 mg/litre

(C) 100 mg/litre

(D) 150 mg/litre

161. If P_0, P_1, P_2 be the populations of a city at times t_0, t_1 and $t_2 = 2t_1$, the saturation value of the population P_s of the city is

(A) $P_s = \dfrac{2P_0P_1P_2 - P_1^2(P_0 + P_2)}{P_0P_2 - P_1^2}$

(B) $P_s = \dfrac{2P_0P_1P_2 - P_2^2(P_0 + P_1)}{P_0P_2 - P_1^2}$

(C) $P_s = \dfrac{P_0P_1P_2 - P_2^2(P_0 + P_1)}{P_0P_2 - P_1^2}$

(D) $P_s = \dfrac{P_0P_1P_2 + P_2^2(P_0 + P_1)}{P_0P_2 - P_1^2}$

162. Most satisfactory formula for an estimate of fire demand Q for a city of population P in thousands for Indian conditions is

(A) $Q = 1115\left(\dfrac{P}{5} + 20\right)$

(B) $Q = 1640 \text{ root } (P)(1 - 0 \cdot 01 \text{ root } P)$

(C) $Q = 3180 \text{ root } P$

(D) None of the above

163. Turbidity of raw water is a measure of

(A) suspended solids

(B) acidity of water

(C) BOD

(D) None of the above

164. For determining the velocity of flow of underground water, the most commonly used non-empirical formula is

(A) Darcy's formula

(B) Slichter's formula

(C) Hazen's formula

(D) Lacey's formula

165. Mostly used coagulant is

(A) chlorine

(B) alum

(C) lime

(D) bleaching powder

166. The load on a spring per unit deflection is called

(A) stiffness

(B) proof resilience

(C) proof stress

(D) proof load

167. Web crippling generally occurs at the point where

(A) bending moment is maximum

(B) shearing force is minimum

(C) concentrated loads act

(D) deflection is maximum

168. The partial factor of safety for resistance governed by ultimate strength is

(A) 1·10

(B) 1·5

(C) 2·0

(D) 1·25

169. The diameter of head for button head rivet is

(A) 1·60d, where
d = nominal rivet diameter

(B) 2·5d, where
d = nominal rivet diameter

(C) 3d, where
d = nominal rivet diameter

(D) 5d, where
d = nominal rivet diameter

170. Lacing shall be designed to resist a total transverse shear equal to _____ of axial force in member.

(A) 5%

(B) 1%

(C) 4·3%

(D) 2·5%

171. Which of the following Indian standard codes is recommended for the loss of prestress due to shrinkage?

(A) IS:1445

(B) IS:1343

(C) IS:1210

(D) IS:1550

172. The fixed support in a real beam becomes in the conjugate beam a

(A) roller support

(B) hinged support

(C) fixed support

(D) free end

173. The degree of kinematic indeterminacy of a pin-jointed plane frame is given by

(A) $2j - r$

(B) $j - 2r$

(C) $3j - r$

(D) $2j + r$

174. The number of independent displacement components at each joint of a rigid-jointed space frame is

(A) 1

(B) 2

(C) 3

(D) 6

175. Which of the following is ***not*** the displacement method?

(A) Equilibrium method

(B) Column analogy method

(C) Moment distribution method

(D) Kani's method