ASSISTANT ENGINEER (CIVIL) PHE

YEAR OF ADVT: 2019
DATE OF EXAM: 11-MAR-2023

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

QUESTION BOOKLET

SERIES I

Subjects : General English, General Knowledge, Civil Engineering

BOOKLET SERIAL NO. 10873

Marks : 300
Time : $2^{1}/_{2}$ 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 Ball Pen in 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. Answers must be shown by completely blackening the corresponding circles in the Answer Sheet against the relevant question number by Black Ball Pen. OMR Answer Sheet without marking series/ double series marking shall not be evaluated.

Example :

Supposing 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 Ball Point Pen only as below :-

Ⓐ Ⓑ ● Ⓓ

WHICH 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.

PART - A - GENERAL ENGLISH

Marks :100

Each question carries 2 marks :

Directions : (Q.NO.1-10), In the following questions, choose the correct answer from the four alternatives.

1. James crossed the broken bridge ____ the warning.
a) In spite of b) In spite off
c) Instead of d) In order of

2. Amy ____ a lot of letters yesterday.
a) Has written b) Had been writing
c) Wrote d) Write

3. Riya read the notice ____ carefully the second time.
a) Many b) Much
c) More d) Most

4. I watched him ____.
a) Fell b) Fall
c) To fall d) Felling

5. Mrs.Jones ____ her daughter to school before she goes to work.
a) Take b) Taking
c) Takes d) Took

6. ____ you like some tea ?
a) Can b) Will
c) Should d) Would

7. Rose hasn't come yet, ____?
a) Hasn't she b) Has she
c) Doesn't she d) Haven't she

8. ____ he was out of practice, Richard won the match easily.
a) Though b) Just
c) Even d) Still

9. I ____ never seen such a picture before.
a) Has b) Was
c) Did d) Have

10. After Ram returned from London, he ___ to visit his grandparents' in Assam.
a) Had wished b) Was wishing
c) Wished d) Is wishing

Directions : (Q.NO.11-20), Fill in the blanks with the appropriate preposition from the given options.

11. Though I am tall, I feel inferior ____ others.
a) To b) From
c) Than d) Before

12. We must start now ____ it will be too late
a) To b) Before
c) Than d) Of

13. Eggs are sold ____ the dozen
a) Before b) For
c) By d) Than

14. In all probability, it ____ rain tonight
a) Can b) May
c) Ought d) Will

15. Do you know the reason ____ his absence?
a) Of b) On
c) For d) To

16. Her thinking leans ____ democracy
a) With b) From
c) Towards d) About

17. It is 10 o'clock ____ my watch.
a) By b) From
c) For d) To

18. Do you usually go out ____ Saturday evenings ?
a) At b) From
c) In d) On

19. The area is ____ close circuit television surveillance
a) Over b) Into
c) About d) Under

20. She was running short ____ time
a) For b) From
c) Of d) In

Directions : (Q.NO.21-25), In these questions, out of the four alternatives given, choose the one that is OPPOSITE in meaning :

21. The President **initiated** the proceedings with a brief speech
a) Started b) Closed
c) Introduced d) Welcomed

22. Teachers are usually **serious** about what they say
a) Thoughtful b) Particular
c) Hurtful d) Insincere

23. I cannot see much **likeness** between the two girls
a) Difference b) Hatred
c) Dislike d) Sameness

24. I find her manners **obnoxious**
a) Abhorrent b) Obscene
c) Agreeable d) Loathsome

25. "Do not **provoke** them to their peril"
a) Goad b) Pacify
c) Aggravate d) To incite

Directions : (Q.NO.26-30) In these questions, choose the word that best expresses the word in capital letters :

26. EMBEZZLE
a) Misconduct b) Misinterpret
c) Clear d) Misuse

27. AUGUST
a) Petty b) Ridiculous
c) Dignified d) Common

28. STARTLED
a) Astonished b) Relaxed
c) Easy d) Comfortable

29. CHASTE
a) Authentic b) Faithful
c) Chase d) Pure

30. ARROGANT
a) Gentlemanly b) Humble
c) Cowardly d) Egotistic

Directions : (Q.NO.31-35) In these questions, choose the option which contains the correct sentence among the four.

31. a) How long are you joined this company?
b) When have you joined this company?
c) How long have you joined this company?
d) When you do join this company?

32. a) After the picnic, we had lots of food left.
b) After the picnic, we had lot of food left.
c) After the picnic, we had lots of foods left.
d) After the picnic, we had lot of foods left.

33. a) I do my works quick
b) I did my work quickly
c) I does my work very quick
d) I did my work quick

34. a) The shadow follows the child everywhere.
b) The shadows follows the child everywhere.
c) The shadows follows the childs everywhere.
d) The shadow following the child everywhere.

35. a) She is both a dancer or a painter.
b) She is both a dancer nor a painter.
c) She is both a dancer as well as a painter.
d) She is both a dancer and a painter.

Directions : (Q.NO.36-40) In these questions, identify the correct sequence from the four alternatives to make a proper sentence.

36. When he
P) did not know
Q) he was nervous and
R) heard the hue and cry at midnight
S) what to do

The proper sentence should be
a) PQRS b) RQPS
c) SQPR d) QSPR

37. It has been established that
P) Einstein was
Q) although a great scientist
R) weak in arithmetic
S) right from his school days

The proper sentence should be
a) SRPQ b) QPSR
c) QPRS d) RQPS

38. Then
P) it struck me
Q) of course
R) suitable it was
S) how eminently

The proper sentence should be

a) PSRQ b) QSRP
c) QPSR d) SPQR

39. People
P) at his dispensary
Q) went to him
R) of all professions
S) for medicine and treatment

The proper sentence should be

a) RPQS b) QPRS
c) PRQS d) RQSP

40. She was so kind and generous that
P) she not only
Q) made others do so
R) but also
S) helped them herself

The proper sentence should be

a) SPQR b) PSRQ
c) PRSQ d) QPRS

Directions : (Q.NO.41-45) In these questions, choose the sentence that fits well as an answer to the direct speech.

41. Rohan asked me, "Did you watch IPL match last evening ?"
a) Rohan asked me whether I watch the IPL match last evening.
b) Rohan asked me whether I had seen the IPL match last evening.
c) Rohan asked me did I watched the IPL match last evening.
d) Rohan asked me whether I see the IPL match last evening.

42. I said to him, "Why are you working so hard?"
a) I asked him why he was working so hard.
b) I asked him why was he working so hard.
c) I asked him why he has been working so hard.
d) I asked him why he had been working so hard.

43. He said to her, "What a cold day!"
a) He told her that it was a very cold day.
b) He exclaimed that what a cold day it was.
c) He exclaimed sorrowfully that it was a very cold day.
d) He exclaimed that it was a very cold day.

44. He told her, "I want to meet your father."
a) He told her that I want to meet your father.
b) He told her that he wanted to meet your father.
c) He told her that he wanted to meet her father.
d) He told her that she wanted to meet her father.

45. She said to me, "I expect you to attend the function."
a) She told me that she expected me to attend the function
b) She told me that she expects me to attend the function
c) She told me that she expected me to have attended the function
d) She told me she expected me to attends the function

Directions : (Q.NO.46-50) In these questions, each of the following idioms is followed by four meanings. Choose the correct option which best conveys the meaning of the idiom.

46.To end in smoke
a) To ruin oneself
b) To light up someone
c) To overcome someone
d) To excite applause

47. To pick holes
a) To cheat someone
b) To quarrel with someone
c) To destroy something
d) To criticise someone

48. To let the grass grow under his feet

a) To move away b) To sit unmoved
c) To be inactive d) To be calm

49. To have backstairs influence
a) To have political influence
b) To have secret and unfair influence
c) To have gracious influence
d) To have proper influence

50. To bell the cat
a) To take lead in danger
b) To tie a bell to a cat's neck
c) To make a noise
d) To be alert

PART - B -GENERAL KNOWLEDGE

Marks : 50

Each question carries 2 marks :

51. The first National Sports University of India is located in which of the following state ?
a) Meghalaya b) Manipur
c) Mizoram d) Assam

52. Who amongst the following leaders in the freedom movement was a 'Moderate'?
a) Lala Lajpat Rai
b) Bipin Chandra Pal
c) Surendranath Bannerjee
d) B.G. Tilak

53. Who is the Chairman of NITI Aayog which replaced planning commission in 2015 ?
a) Prime Minister b) President
c) Vice President d) Finance Minister

54. The forest in Sunderbans is called
a) Scrub jungle b) Mangrove
c) Deciduous forest d) Tundra

55. Noise is measured in
a) Watt b) REM
c) Centigrade d) Decibel

56. Which is an extra constitutional body ?
a) Language Commission
b) NITI Aayog
c) Election Commission
d) Finance Commission

57. The Prime Minister of India is
a) Elected b) Appointed
c) Nominated d) Selected

58. The Directive Principles of State Policy was adopted from the
a) British Constitution b) Swiss Constitution
c) U.S. Constitution d) Irish Constitution

59. The monetary policy in India is formulated by
a) Central government
b) Industrial Financial Corporation of India
c) Reserve Bank of India
d) Industrial Development Bank of India

60. WTO basically promotes
a) Financial support
b) Global peace
c) Unilateral trade
d) Multilateral trade

61. 'World No Tobacco Day' is observed on which of the following days ?
a) 1st May b) 10th May
c) 21st May d) 31st May

62. Many times we read in Newspapers about the GM crops. What is the full form of GM ?
a) Generally marketed
b) Genetically modified
c) Green and Moisturous
d) Globally Marketed

63. Chinese Parliament is known as
a) National People's Congress
b) National Assembly
c) National Parliament of China
d) House of democracy of China

64. Upper House of Indian Parliament is known as
a) Lok Sabha
b) Rajya Sabha
c) The National Assembly
d) The Indian Parliament

65. Which of the following country is known as 'Breadbasket' of Europe ?
a) Romania b) Poland
c) Ukraine d) Hungary

66. Who was the first Chief Justice of High Court of Meghalaya ?
a) Justice Hamarsan Singh Thangkhiew
b) Justice T. Meena Kumari
c) Justice Uma Nath Singh
d) Justice Biswanath Somadder

67. Union Budget is always presented first in
a) The Lok Sabha
b) The Rajya Sabha
c) Joint Session of the Parliament
d) Meeting of the union cabinet

68. Which amongst the following is the Programme launched in 2015 by the Government keeping the female foeticide in mind ?
a) Beti Bachao, Naam Kamao
b) Beti Bachao, Desh Bachao
c) Beti Bachao, Desh Banao
d) Beti Bachao, Beti Padhao

69. 'Agha Khan Cup' is associated with the game of
a) Football b) Badminton
c) Hockey d) Tennis

70. The World Heritage Day is observed on
a) March 18 b) April 20
c) March 20 d) April 18

71. Disguised unemployment occurs
a) When workers lose their current job and are in the process of finding another one
b) Where a person is willing to work at
c) Wherein the skills of labour force are not utilised to their full capacity
d) When an unemployed choose not to accept a job at the on going wage rate

72. The unlawful detention of a person is questioned by the writ of
a) Quo Warranto b) Habeas Corpus
c) Certiorari d) Prohibition

73. A socialist state emphasizes on
a) Right to Private Property
b) Economic equality
c) Independence of Judiciary
d) Political freedom

74. Why is Article 16 of the Constitution important ?
a) It declares that all laws that are inconsistent with any of the fundamental rights shall be void
b) It abolishes untouchability and forbids its practice in any form
c) It explicitly clarifies that a policy like reservation will not be seen as a violation of the right to equality
d) It abolishes titles

75. Which of the following is used as a moderator in Nuclear reactors ?
a) Thorium b) Ordinary Water
c) Graphite d) Teflon

PART - C -CIVIL ENGINEERING

Marks :200

Each question carries 2 marks :

76. The shape of the bending moment diagram over the length of a beam, having no external load, is always
a) Linear b) Parabolic
c) Cubical d) Circular

77. The minimum number of rivets for the connection of a gusset plate, is
a) 1 b) 2
c) 3 d) 4

78. For a simply supported beam with a central load, the bending moment is
a) Least at the centre
b) Least at the supports
c) Maximum at the supports
d) Minimum at the centre

79. A shaft turning 150 r.p.m. is subjected to a torque of 150 kgm. Horse power transmitted by the shaft is
a) π b) 10π
c) π^2 d) $1/\pi$

80. 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) 1/8
c) 1/2 d) 2

81. 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

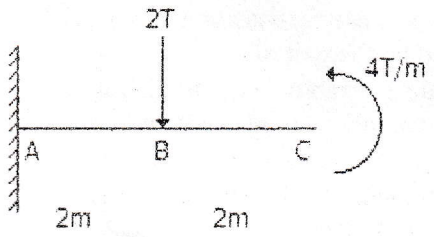
82. The deflection of any rectangular beam simply supported, is
a) Directly proportional to its weight
b) Inversely proportional to its width
c) Inversely proportional to the cube of its depth
d) Directly proportional to the cube of its length

83. In a beam, the neutral plane
a) May be its centre
b) Passes through the C.G. of the area of cross-section
c) Does not change during deformation
d) None of these

84. A reinforced concrete beam is assumed to be made of
a) Homogeneous material
b) Heterogeneous material
c) Isotropic material
d) None of these

85. Pick up the correct statement from the following
a) A ductile material has large plastic zone
b) A brittle material has no plastic zone
c) A rigid material has no plastic zone
d) All of the above

86. The B.M. of a cantilever beam shown in below figure is



a) Zero b) 8 Tm
c) 12 Tm d) 20 Tm

87. An ideal vertical curve to join two gradients, is
a) Circular b) Parabolic
c) Elliptical d) Hyperbolic

88. In chain surveying tie lines are primarily provided
a) To check the accuracy of the survey
b) To take offsets for detail survey
c) To avoid long offsets from chain lines
d) To increase the number of chain lines

89. The accuracy of measurement in chain surveying, does not depend upon
a) Length of the offset
b) Scale of the plotting

c) Importance of the features
d) General layout of the chain lines

90. Pick up the method of surveying in which field observations and plotting proceed simultaneously from the following
a) Chain surveying
b) Compass surveying
c) Plan table surveying
d) Tacheometric surveying

91. A bearing of a line is also known as
a) Magnetic bearing b) True bearing
c) Azimuth d) Reduced bearing

92. Offsets are measured with an accuracy of 1 in 40. If the point on the paper from both sources of error (due to angular and measurement errors) is not to exceed 0.05 cm on a scale of 1 cm = 20m, the maximum length of offset should be limited to
a) 14.14 b) 28.28
c) 200m d) None of these

93. The main principle of surveying is to work
a) From part to the whole
b) From whole to the part
c) From higher level to the lower level
d) From lower level to higher level

94. Measuring with a 30m chain, 0.01m too short, introduces
a) Positive compensating error
b) Negative compensating error
c) Positive cumulative error
d) Negative cumulative error

95. Metric chains are generally available in
a) 10m and 20m length
b) 15m and 20m length
c) 20m and 30m length
d) 25m and 100m length

96. The reduced bearing of a line is N 87° W. Its whole circle bearing is
a) 87° b) 273°
c) 93° d) 3°

97. Gypsum is a
a) Mechanically formed sedimentary rock
b) Igneous rock
c) Chemically precipitated sedimentary rock
d) Metamorphic rock

98. A good building stone should not absorb water more than
a) 5% b) 10%
c) 15% d) 20%

99. The frog of the brick in a brick masonry is generally kept on
a) Bottom face b) Top face
c) Shorter side d) Longer side

100. Quick lime is
a) Calcium carbonate
b) Calcium oxide
c) Calcium hydroxide
d) None of the above

101. The main constituent which imparts hydraulicity to hydraulic lime is
a) Calcium oxide b) Silica
c) Clay d) Water

102. Le Chatelier's device is used for determining the
a) Setting time of cement
b) Soundness of cement
c) Tensile strength of cement
d) Compressive strength of cement

103. As per IS specifications, the maximum final setting time for ordinary Portland cement should be
a) 30 minutes b) 1 hour
c) 6 hours d) 10 hours

104. For testing compressive and tensile strength of cement, the cement mortar is made by mixing cement and standard sand in the proportions of
a) 1:2 b) 1:3
c) 1:4 d) 1:6

105. Which of the following stresses is used for identifying the quality of structural steel ?
a) Ultimate stress b) Yield stress
c) Proof stress d) None of the above

106. In brick masonry the bond produced by laying alternate headers and stretchers in each course is known as
a) English bond b) Double flemish bond
c) Zigzag bond d) Single flemish bond

107. A queen closer is a

a) Brick laid with its length parallel to the face or direction of wall
b) Brick laid with its breadth parallel to the face or direction of wall
c) Brick having the same length and depth as the other bricks but half the breadth
d) Brick with half the width at one end and full width at the other

108. Expansion Joints in masonry walls are provided in wall lengths usater than
a) 10m b) 20m
c) 30m d) 40m

109. Pitched and sloping roofs are suitable for
a) Coastal regions b) Plain regions
c) Covering large areas d) All of the above

110. The function of king post in a king post roof truss is
a) To support the frame work of the roof
b) To receive the ends of principal rafter
c) To prevent the walls from spreading outward
d) To prevent the tie beam from sagging at its centre

111. The lateral earth pressure on a retaining wall
a) Is equal to 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

112. 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 these

113. The minimum water content at which the soil retains its liquid state and also possesses a small shearing strength against flowing, is known
a) Liquid limit b) Plastic limit
c) Shrinkage limit d) Permeability limit

114. Factor of safety against sliding of a slope, is the ratio of
a) Actual cohesion to that required to maintain stability of slope
b) Shear strength to shear stress along the surface
c) Neither (a) nor (b)
d) Both (a) and (b)

115. The ratio of the volume of voids to the volume of soil solids in a given soil mass, is known
a) Porosity b) Specific gravity
c) Void ratio d) Water content

116. Degree of saturation of a natural soil deposit having water content 15%, specific gravity 2.50 and void ratio 0.5, is
a) 50% b) 60%
c) 75% d) 80%

117. The water content of soil is defined as the ratio of
a) Volume of water to volume of given soil
b) Volume of water to volume of voids in soil
c) Weight of water to weight of air in voids
d) Weight of water to weight of solids of given mass of soil

118. The liquid limit and plastic limit exist in
a) Sandy soils b) Silty soils
c) Gravel soils d) Clay soils

119. The seepage force in a soil, is
a) Perpendicular to the equipotential lines
b) Proportional to the exit graident
c) Proportional to the head loss
d) All of the above

120. 260 g of wet soil was taken in a pycnometer jar of weight 400 g in order to find the moisture content in the soil, with specific gravity of soil particles 2.75. The weight of soil and remaining water filled in pycnometer without air bubbles was 1415 g and the weight of pycnometer filled with water alone was 1275 g. The moisture content in the soil is
a) 24.2% b) 18.2%
c) 53.8% d) None of these

121. Pick up the incorrect statement from the following
a) Compaction has no effect on the structure of a soil
b) Permeability decreases with increase in the dry density of a compacted soil
c) A wet side compected soil is more compressible than a dry side compacted soil

d) Dry side compaction soils swell more when given access to moisture

122. The general relationship between specific gravity (G), weight of water ($\gamma\omega$), degree of saturation (Sr), void ratio (e) and bulk density (γ), is

a) $y = \frac{(S - eS_r)\gamma\omega}{1+e}$

b) $y = \frac{(G + eS_r)\gamma\omega}{1+e}$

c) $y = \frac{(1+e)\gamma\omega}{G+S_r}$

d) $y = \frac{(1+S_r)e}{G+S_r}$

123. The capillary rise of water
a) Depends upon the force responsible
b) Increases as the size of the soil particles increases
c) Decreases as the size of the soil particles decreases
d) Is less in wet soil than in dry soil

124. 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 km/h, is
a) 16.0m b) 42.3m
c) 84.6m d) None of these

125. 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%

126. The minimum ratio of the radii of two circular curves of a compound curve, is kept
a) 1.25 b) 1.5
c) 1.75 d) 2.0

127. Border Roads Organisation for hilly regions, was formed in
a) 1947 b) 1954
c) 1958 d) 1960

128. Design of flexible pavements is based on
a) Mathematical analysis
b) Empirical formulae
c) A compromise of pure theory and pure empirical formula
d) None of these

129. The efficiency of the brakes of a vehicle depends upon
a) Condition of road surface
b) Condition of the tyres
c) Presence of the show moisture
d) All of the above

130. 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) L/24 R b) L^2/24 R
c) L^3/24 R d) L^4/24 R

131. Shoulders for high traffic volume roads, should
a) Be stable throughout the year to be used by vehicles in the case of emergency
b) Support and protect the ends of carriage ways
c) Not allow entrance of water to sub-grade
d) All of the above

132. According to IRC:52-1973, for a single lane National Highway in hilly region,
a) Width of the carriageway must be 3.75m
b) Shoulders on either side must be 1.25m
c) Total width of the road-way must be 6.25m
d) Total of the above

133. If L is the length of a moving vehicle and R is the radius of curve, the extra mechanical width b to be provided on horizontal curves.

a) $\frac{L}{R}$ b) $\frac{L}{2R}$

c) $\frac{L^2}{2R}$ d) $\frac{L^3}{2R}$

134. The extra widening of pavements recommended by Indian Roads Congress for hill roads having radius 150 metres, is
a) 1.5m b) 1.0m
c) 0.5m d) 0.0m

135. The steepest gradient permitted on roads which, in ordinary conditions, does not exceed, is known

a) Ruling gradient b) Maximum gradient
c) Exceptional gradient d) Floating gradient

136. Normal formation width of a hill road for one-way traffic, is
a) 3.6m b) 4.8m
c) 6.6m d) 7.2m

137. 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 2.5m, is
a) 1 metre of water b) 2 metres of water
c) 3 metres of water d) 3.5 metres of water

138. Unit of kinematic viscosity is
a) m^2/sec b) Newton sec/m^2
c) Newton sec/m^3 d) Kg sec/m^2

139. A syphon is used
a) To connect water reservoirs at different levels intervened by a hill
b) To supply water to a town from higher level to lower level
c) To fill up a tank with water at higher level from a lower level
d) None of these

140. Critical depth (h) of a channel, is

a) $h=\frac{v^2}{g}$ b) $h=\frac{v^2}{2g}$

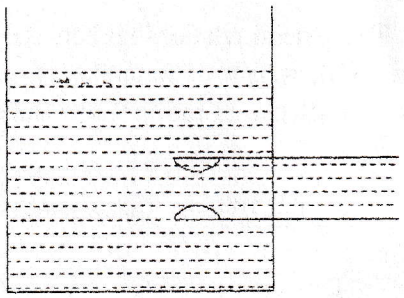
c) $h=\frac{v}{2g}$ d) $h=\frac{v}{g}$

141. The side slope of Cipolletti weir is generally kept
a) 1 to 4 b) 1 to 3
c) 1 to 2 d) 1 to 5

142. Reynold number is the ratio of initial force and
a) Viscosity b) Elasticity
c) Gravitational force d) Surface tension

143. The phenomenon occuring 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 these

144. The mouth piece shown in the below figure is generally known as



a) Internal mouth piece
b) Re-entrant mouth piece
c) Borda's mouth piece
d) All of the above

145. The continuity equation
a) Expresses the relationship between work and energy
b) Relates the momentum per unit volume between two points on a stream line
c) Relates mass rate of flow along a stream line
d) Requires that Newton's second law of motion be satisfied at every point in fluid

146. Irrigation canals are generally aligned along
a) Ridge line b) Contour line
c) Valley line d) Straight line

147. The difference in level between the top of a bank and supply level in a canal, is called
a) Berm b) Free board
c) Height of bank d) None of these

148. The depth of the crest of a scouring sluice below the crest of a head regulator, is generally kept
a) 0.20m b) 1.20m
c) 2.20m d) 3.20m

149. If Δ is the depth of water in metres, B is the number of days of base period and D is the duty in hactare/cumec, the relationship which holds good, is

a) $D=\Delta\frac{8.64D}{B}$ b) $B=\Delta\frac{8.64D}{D}$

c) $D=\frac{8.64\Delta}{B}$ d) $\Delta=\frac{8.64B}{D}$

150. According to Khosla, the exist gradient of

surface flow
a) Depends upon the b/d ratio
b) Is independent of the b/d ratio
c) Is independent of the depths of d/s cut off walls
d) None of these

151. The Lacey's regime velocity is proportional to
a) $R^{1/2}S^{3/4}$ b) $Q^{3/4}S^{1/3}$
c) $R^{3/4}S^{1/3}$ d) $R^{2/3}S^{1/2}$

152. Surge tanks are used
a) For storage water
b) To increase the velocity in a pipeline
c) As overflow valves
d) To guard against water hammer

153. In slow sland 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

154. Biochemical Oxygen Demand (B.O.D.) of safe drinking water must be
a) Nil b) 5
c) 10 d) 15

155. Acidity in water is caused due to
a) Mineral acids b) Free CO_2
c) Iron sulphate d) All of the above

156. The transitional middle portion of a logistic curve follows
a) A geometric growth
b) A logarithmic growth
c) A first over curve
d) A constant rate

157. Pick up the correct statement from the following
a) Excess quantities of iron and manganese in water, cause discolouration of clothes
b) Lead and barium salts have toxic effect
c) Arsenic and selenium are poisonous to human health
d) All of the above

158. Pick up the incorrect statement from the following regarding fire hydrants
a) Fire hydrants are fitted in water mains at 100m to 150m apart at fire
b) The minimum water pressure hydrants, is kept 1.5 kg/cm^2
c) The water at pressure 1 to 1.5 kg/cm^2 is made available for 4 to 5 hours for constant use
d) None of these

159. The specific retention is least in case of
a) Clay b) Sand
c) Silt d) Coarse gravel

160. B.O.D. of treated water should be
a) 10 ppm b) 25 ppm
c) 20 ppm d) Nil

161. Most commonly used pump for lifting water in water supply mains, is
a) Axial flow pump
b) Reciprocating pump
c) Rotary type pump
d) Centrifugal pumps

162. Distribution mains of any water supply, is normally designed for its average daily requirement
a) 100% b) 150%
c) 200% d) 225%

163. If pH value of water is
a) 7 water it is said to be neutral
b) Less than 7 it is said to be acidic
c) More than 7 it is said to be alkaline
d) All of the above

164. In pressure supply mains, water hammer pressure is reduced by providing
a) Sluice valves b) Air valves
c) Pressure relief valves d) None of these

165. The minimum recommended diameter of sewers, is
a) 5cm b) 10cm
c) 15cm d) 20cm

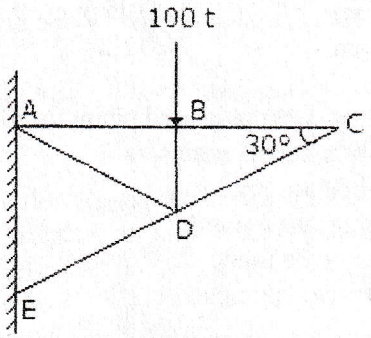
166. Aerobic bacterias
a) Flourish in the presence of free oxygen
b) Consume organic matter as their food
c) Oxidise organic matter in sewage
d) All of the above

167. The rate of accumulation of sludge in septic tanks is recommended as
a) 30 litres/person/year
b) 25 litres/person/year
c) 30 litres/person/month

d) 25 litres/person/month

168. Shear strain energy theory for the failure of a material at elastic limit, is due to
a) Rankine b) Guest or Trecas
c) St. Venant d) Von Mises

169. In the truss shown in the given figure, the force in member BC is



a) 100 t compressive b) 100 t tensile
c) Zero d) Indeterminate

170. The total strain energy of a beam of length L, having moment of inertia of its section I, when subjected to a bending moment M, is

a) $\frac{M^2}{EI}\delta_x$ b) $\frac{M^2}{2EI}\delta_x$

c) $\int_0^L \frac{M^2}{2EI}\delta_x$ d) $\int_0^L \frac{M^2}{EI}\delta_x$

171. The ratio of maximum shear stress to average shear stress of a circular beam, is

a) $\frac{2}{3}$ b) $\frac{3}{2}$

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

172. If Q is load factor, S is shape factor and F is factor of safety in elastic design, the following
a) Q = S + F b) Q = S - F
c) Q = F - S d) Q = S x F

173. The equivalent length of a column of length L, having both the ends hinged, is
a) 2L b) L
c) L/2 d) 3L

174. At yield point of a test piece, the material
a) Obeys Hooke's law
b) Behaves in an elastic manner
c) Regains its original shape on removal of the load
d) Undergoes plastic deformation

175. For the close coil helical spring of the maximum deflection is

a) $\frac{WD^3n}{d^4N}$ b) $\frac{2WD^3n}{d^4N}$

c) $\frac{4W^2D^3n}{d^4N}$ d) $\frac{8WD^3n}{d^4N}$

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