

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2010.

Ph.D. (CIVIL ENGINEERING)

COURSE CODE : 137

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 137

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. The moisture absorption of a good stone should be less than
 (A) 1% (B) 5% (C) 10% (D) 15%
2. The crushing strength of first class bricks should be at least
 (A) 50 kg/cm² (B) 80 kg/cm²
 (C) 105 kg/cm² (D) 200 kg/cm²
3. The initial setting time for ordinary Portland cement as per IS specifications should not be less than _____ and final setting time should not be more than _____
 (A) 30 min, 600 min (B) 600 min, 60 min
 (C) 60 min, 600 min (D) 30 min, 300 min
4. Which of the following test is conducted on Los Angeles testing machine?
 (A) Attrition test (B) Abrasion test
 (C) Impact test (D) Crushing strength test
5. Pick the most acceptable statement
 (A) Sand increases Shrinkage and decreases cracking of mortar on setting
 (B) Sand decreases shrinkage and increases cracking of mortar on setting
 (C) Sand decreases shrinkage and cracking of mortar on setting
 (D) Sand increases shrinkage and cracking of mortar on setting
6. The seven days and 14 days compressive strength of OPC 43 grade as per IS 269 should be
 (A) 26 N/mm² and 38 N/mm² (B) 16 N/mm² and 28 N/mm²
 (C) 12 N/mm² and 18 N/mm² (D) 6 N/mm² and 8 N/mm²
7. You are asked to construct a massive dam, the type of cement you will use is
 (A) Ordinary Portland cement (B) Rapid hardening cement
 (C) Blast furnace slag cement (D) Low heat cement
8. An aggregate is set to be flaky if its least dimension is less than
 (A) 2/3 mean dimension (B) 3/4 mean dimension
 (C) 3/5 mean dimension (D) 5/8 mean dimension

9. Pick up the correct statement from the following
- (A) The maximum size of coarse aggregate is 75 mm & minimum 4.75 mm
 - (B) The maximum size of fine aggregate is 4.75 & minimum 0.075 mm
 - (C) The Material having particles of size less than 0.002 mm is known as clay.
 - (D) All the above
10. Higher workability of concrete is required if the structure is
- (A) Made with cement concrete
 - (B) Thick & reinforced
 - (C) Thin & heavily reinforced
 - (D) Thick & heavily reinforced.
11. Pick up the correct statement from the following
- (A) The diameter of pipeline used for transportation of concrete by pumps doesn't exceed 30 cm
 - (B) The slump of a concrete to be pumped should not be less than 5 cm and more than 8 cm
 - (C) The water cement ratio of the concrete to be pumped is kept between 0.5 to 0.65.
 - (D) All the above
12. To prevent segregation the maximum height for placing concrete is
- (A) 100 cm
 - (B) 125 cm
 - (C) 150 cm
 - (D) 200 cm
13. While compacting the concrete by a mechanical vibrator the slump should not exceed
- (A) 2.5 cm
 - (B) 5 cm
 - (C) 7.5 cm
 - (D) 10 cm
14. The most useless aggregate is one whose surface texture is
- (A) smooth
 - (B) granular
 - (C) glassy
 - (D) honeycombed and porous
15. The moment of inertia of a triangular section(base b, height h) about centroidal axis parallel to the base is
- (A) $b^3h/12$
 - (B) $bh^3/36$
 - (C) $b^3h/6$
 - (D) $b^3h/2$

16. The Angle which an inclined surface makes with the horizontal when a body placed on it is on the point of moving down is called
- (A) Angel of repose (B) Angle of friction
(C) Angle of inclination (D) None of the above.
17. The property of a material by which it can be beaten or rolled into thin plates is called
- (A) Ductility (B) Malleability (C) Plasticity (D) Elasticity
18. The material which have the same elasticity properties in all direction is called
- (A) homogeneous (B) isotropic (C) brittle (D) hard
19. The ratio of elongations of a conical bar due to its own weight and that of a prismatic bar of the same length
- (A) $1/2$ (B) $1/3$ (C) $1/5$ (D) $1/4$
20. The type of butt joints in common use is
- (A) Single inverted V butt joint (B) Double V Butt joint
(C) Double U Butt joint (D) Single U butt joint.
21. The shear force on a simply supported beam is proportional to
- (A) Displacement of neutral axis
(B) Some of transverse forces
(C) Algebraic some of the transverse forces of the section
(D) Curvature of neutral axis
22. If the width of a simply supported beam carrying an isolated load at its centre is doubled, the deflection of the beam at the centre is changed by a
- (A) two times (B) four times
(C) eight times (D) three times
23. The shear stress at any section of a shaft is maximum
- (A) at the centre of the section (B) at a distance of $R/2$ from centre
(C) at a distance $3/4R$ from centre (D) at the top of the surface.

24. The ratio of moments of resistance of a solid circular shaft of diameter D and a hollow shaft (external diameter 1 & internal diameter d), is
 (A) $D^4 / D^4 - d^4$ (B) $D^3 / D^3 - d^3$ (C) $D^4 - d^4 / D^4$ (D) $D^3 - d^3 / D^3$
25. The ratio of maximum and average shear stress on a circular beam is
 (A) $2/3$ (B) $3/2$ (C) $3/4$ (D) 1
26. Pick up the incorrect statement from the following :
 The torsional resistance of a shaft is directly proportional to
 (A) Modulus of rigidity (B) Angle of twist
 (C) Reciprocal of the length of the shaft (D) Moment of inertia of shaft section
27. The length of the straight portion of a bar beyond the end of the hook should be at least
 (A) twice the diameter (B) three times
 (C) four times (D) seven times
28. As per IS 1893-2002 Pondicherry is under seismic
 (A) Zone II (B) Zone III
 (C) Zone IV (D) None of the above
29. The least lateral dimension of a column should be at least _____ for seismic resistance
 (A) 230 mm (B) 300 mm (C) 350 mm (D) 400 mm
30. A single reinforced concrete beam of 250 mm width 700 mm effective depth is provided with 1875 mm² steel. If the modular ratio is 15. The depth of neutral axis is
 (A) 200 mm (B) 250 mm (C) 300 mm (D) 350 mm
31. The lapped splices in tensile reinforcement are generally not used for bars of size large than
 (A) 16 mm diameter (B) 24 mm diameter
 (C) 32 mm diameter (D) 36 mm diameter
32. The maximum ratio of span to depth of a slab simply supported and spanning in one direction is
 (A) 35 (B) 25 (C) 30 (D) 20

33. According to IS 456, slabs which span in two directions with corners held down, are assumed to be divided in each directions into middle strips and edge strips such that the width of the middle strip, is
- (A) half of the width of the slab
 - (B) two third of the width of the slab
 - (C) four-fifth of the width of the slab
 - (D) three fourth of the width of the slab
34. Pick up the true statement from the following
- (A) Plain ceiling provides the best property diffusing light
 - (B) In the absence of beams, it is easier to install piping
 - (C) In the absence of beams, it is easier to paint
 - (D) All the above.
35. In a pre-stressed concrete beam, due to the combined effect of pre-stressing force and the external loading a resultant compressive force acts on the concrete section. The locus of points of action of this resultant compressive force is called
- (A) pressure line
 - (B) elastic line
 - (C) transverse axis
 - (D) longitudinal axis
36. In pre-stressed concrete high tensile steel wire is used because
- (A) it can take up a large tension
 - (B) it is more economical
 - (C) it can be subjected to a large tension so that even after the loss of pre-stress, the final tension is sufficiently large
 - (D) it occupies less space than MS bars.
37. Bottom bars under the columns are extended into the interior of the footing slab to a distance of
- (A) 42 diameters from the centre of the column
 - (B) 42 diameters from the inner edge of the column
 - (C) 42 diameter from the outer edge of the column
 - (D) 24 diameter from the centre of the column

38. A pile of length L carrying a uniformly distributed load W per meter length is suspended at two points, the maximum, B.M at the centre of the pile or at the point of suspension, is
(A) $WL/8$ (B) $WL^2/24$ (C) $WL^2/47$ (D) $WL^2/26$
39. The shear reinforcement in R.C.C is provided to resist,
(A) vertical shear (B) horizontal shear
(C) diagonal compression (D) diagonal tension.
40. A continuous beam shall be deemed to be deep beams if the ratio of effective span to overall depth, is
(A) 2.5 (B) 2.0
(C) less than 2 (D) less than 2.5
41. 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
42. As per ISI, rolled steel beams section are classified into
(A) two series (B) three series
(C) four series (D) five series
43. The rivets which are heated and then driven in the field, are known,
(A) power driven shop rivets (B) power driven field rivets
(C) hand driven rivets (D) cold driven rivets.
44. Diameter of a rivets hole is made larger than the diameter of the rivet by
(A) 1.00 mm for rivets diameter up to 12 mm
(B) 1.5 mm for rivets diameter exceeding 25 mm
(C) 2.00 mm for rivets diameter over 25 mm
(D) none of these
45. According to IS 800, lacing bars resist transverse shear equal to
(A) 1.0% of the axial load (B) 2.0% of the load axial
(C) 2.5% of the axial load (D) 3.0% of the axial load.

46. The deflection of the beams maybe decreased by
(A) increasing the span (B) increasing the depth of beam
(C) decreasing the depth of beams (D) increasing the width of the beam
47. The tensile strength of mild steel for bolts and nuts should not be less than
(A) 32 kg/mm² (B) 44 kg/mm² (C) 40 kg/mm² (D) 41 kg/mm²
48. The thickness of the web of a mild steel plate girder is less than $d / 200$. If only one horizontal stiffener is used, it is placed at
(A) The neutral axis of the section
(B) $2/3^{\text{rd}}$ of the depth of the neutral axis from the compression flange
(C) $2/5^{\text{th}}$ of the depth of the neutral axis from the compression flange
(D) $2/5^{\text{th}}$ of the flange of the neutral axis from tension flange
49. Any gradient on a road is said to be an exceptional gradient, if it is
(A) more than ruling gradient
(B) less than average gradient
(C) more than floating gradient
(D) less than minimum gradient or more than maximum gradient
50. If no super elevation is provided on a road along curves, pot holes may develop at
(A) inner edge of the road (B) outer edge of the road
(C) centre of the road (D) no where on the road.
51. The distance travelled by a moving vehicle during perception and brake reaction times, is known as,
(A) sight distance (B) stopping distance
(C) lag distance (D) none of these
52. According to IRC 52 – 1973, for a single lane national highway in hilly region
(A) Width of the carriageway must be 3.75 m
(B) Shoulders on either side must be 1.25 m
(C) Total width of the road way must be 6.25 m
(D) Total of the above

53. Super elevation on road in snow bound areas, should generally not exceed
 (A) 15% (B) 12% (C) 10% (D) 7%
54. The basic formula for determination of pavement thickness was first suggested by
 (A) Spangler (B) Picket
 (C) Kelly (D) Goldbeck
55. For maximum strength and durability minimum percentage of cement, by weight is
 (A) 15% (B) 20% (C) 25% (D) 30%
56. Cement grouted pavement is classified as
 (A) Semi rigid pavement (B) Rigid pavement
 (C) Flexible pavement (D) None of the above.
57. Design of flexible pavement is based on
 (A) Mathematical analysis
 (B) Empirical formula
 (C) A compromise of pure theory and pure empirical formula
 (D) None of the above
58. Traffic census is carried out for
 (A) Speed and delay study (B) Road parking study
 (C) Traffic volume study (D) All the above
59. Maximum number of passengers 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
60. To prevent a head on collision of vehicles travelling in opposite directions along four lane roads
 (A) Markings on the road are provided
 (B) Physical dividers are provided
 (C) Area dividers are provided
 (D) Medians of wide area are provided

61. Pick up the correct statement from the following
- (A) Minimum desirable width of median on rural highways is 5 mts
 - (B) Minimum width of medians should be 3 mts
 - (C) On long bridges and viaducts the width of median should be 1.5 mts
 - (D) All the above
62. While calculating the overtaking sight distance, the height of the object above road surface, is assumed
- (A) Zero
 - (B) 50 cm
 - (C) 75 cm
 - (D) 120 cm
63. If V is speed in Km/ hour and R is radius of the curve, the super elevation e is equal to
- (A) $V^2/125R$
 - (B) $V^2/225R$
 - (C) $V^2/325R$
 - (D) $V^2/25R$
64. Rail section is generally designated by
- (A) Total weight
 - (B) Total length
 - (C) Weight per meter length
 - (D) Area of its cross section.
65. On Indian railways standard length of rails for 13.0. tracks is
- (A) 10.06 m
 - (B) 10.97 m
 - (C) 12.80 m
 - (D) 11.20 m
66. The sleepers which satisfy the requirements of an ideal sleepers, are
- (A) Cast iron sleepers
 - (B) R.C.C sleepers
 - (C) Steel sleepers
 - (D) Wooden sleepers
67. For flat bottom sleepers, maximum size of ballast, is
- (A) 50 mm
 - (B) 40 mm
 - (C) 20 mm
 - (D) 25 mm
68. Maximum cant deficiency prescribed on Indian board gauge railways, is
- (A) 40 mm
 - (B) 50 mm
 - (C) 75 mm
 - (D) 100 mm
69. To cope up with the high temperature the taxi ways and aprons are constructed with
- (A) Asphaltic concrete
 - (B) Rubberized tar concrete
 - (C) Plain concrete
 - (D) All the above
70. Airport elevation is the reduced level above MSL of
- (A) Control tower
 - (B) Highest point of the landing area
 - (C) Lowest point of the landing area
 - (D) None of these

71. Liquids
- (A) cannot be compressed
 - (B) do not occupy definite shape
 - (C) are not affected by change in pressure and temperature.
 - (D) none of the above
72. Water belongs to
- (A) Newtonian fluids
 - (B) Non-Newtonian fluids
 - (C) Compressible fluid
 - (D) None of these
73. A rise or fall of liquid in a glass tube of a very small diameter when dipped is
- (A) Directly proportional to the force per unit length of periphery
 - (B) Directly proportional to the sine of the angle of contact
 - (C) Directly proportional to the specific weight of liquid
 - (D) Inversely proportional to the diameter of the glass tube
74. The unit of the viscosity is
- (A) Kg sec/m^2
 - (B) Newton sec per
 - (C) $\text{Newton-sec}^2/\text{m}^3$
 - (D) $\text{m}^2/\text{per sec}$
75. Mercury is generally used in barometers because
- (A) Its vapour pressure is practically zero
 - (B) The height of the barometer will be less
 - (C) Both (A) & (B)
 - (D) None of these
76. Most economical section of a circular channel for a maximum discharge
- (A) Depth of water = 0.95 diameter of circular section
 - (B) Hydraulic mean depth = 0.286 diameter of circular section
 - (C) Wetted perimeter = 2.6 diameter of circular section
 - (D) All the above

77. Back water curve is caused if
- (A) Friction head loss is more than the bed slope
 - (B) Pressure is due to weir in the channel
 - (C) There is an increase in width of the channel
 - (D) None of these
78. Infiltration capacity of soil depends on
- (A) Number of voids present in the soil
 - (B) Shape and size of soil particles
 - (C) Arrangement of soil particles
 - (D) All the above.
79. Absolute humidity in Air
- (A) decreases at Higher altitudes
 - (B) increase at higher altitudes
 - (C) remains constant at all altitudes
 - (D) none of these
80. Non-recording rain gauges
- (A) Collect the rain whose volume is measured by means of graduated cylinders
 - (B) Collect the rain which is directly measures by means of graduated cylinders in centimeters of water depth
 - (C) Are generally used in hilly terrain
 - (D) Are cylindrical in shape
81. In India the recording type rain gauge generally used is
- (A) weighing type
 - (B) tipping type
 - (C) float recording type
 - (D) none of these
82. The time required by rain water to reach the outlet of drainage basin, is generally called
- (A) Time of concentration
 - (B) Time of overland flow
 - (C) Concentration time of overland flow
 - (D) All the above
83. The quantity of water retained by the sub-soil against gravity is known as
- (A) yield
 - (B) specific yield
 - (C) porosity
 - (D) specific retention

84. Consumptive use of crop during growth, is the amount of
(A) Interception (B) Transpiration
(C) Evaporation (D) All the above
85. The rate of evaporation from the reservoirs maybe determined by
(A) Pan measurement method (B) Evaporation method
(C) Lysimeter method (D) None of the above
86. The sludge does not contain waste water from
(A) bath rooms (B) wash basins
(C) kitchen sinks (D) toilets
87. The sewerage system originates from
(A) house sewers (B) lateral sewers
(C) main sewers (D) branch sewers
88. If the diameter of sewer is 225 mm, the gradient required for generating self cleansing velocity is
(A) 1 in 60 (B) 1 in 100
(C) 1 in 120 (D) none of these
89. For non-scouring velocity of 5 m/sec, the type of sewers generally preferred to, is
(A) cast iron sewers (B) cement concrete sewers
(C) glazed brick sewers (D) stoneware sewers
90. An inverted siphon is designed generally for
(A) one pipe (B) two pipe
(C) three pipes (D) four pipes
91. If the flame of a miner's safety lamp in the upper layers of the sewer forms an explosive, the sewer certainly contains
(A) Hydrogen sulphide (B) Carbon di-oxide
(C) Methane (D) Oxygen

92. For detecting nitrates in sewage, the colour may be developed by adding
(A) Potassium permanganate
(B) Phenol-disulphide acid and potassium hydroxide
(C) None of these
(D) All of these
93. Primary treatment of sewage consists of removal of
(A) Large suspended organic solids (B) Oil and grease
(C) Sand and girt (D) All the above
94. The digested sludge from septic tanks, is removed after a maximum period of
(A) 3 years (B) 4 years (C) 5 years (D) 6 years
95. The maximum pressure which the pipe can withstand without any leakage during hydrostatic pressure test is called
(A) working pressure (B) design pressure
(C) test pressure (D) hydrostatic pressure
96. The first method invented for planning projects, was
(A) Bar chart method (B) Milestone chart
(C) CPM (D) PERT
97. The estimated time required to perform an activity is known as
(A) duration (B) event (C) dummy (D) float
98. The time by which an activity completion time can be delayed without affecting the start of succeeding activities, is known as
(A) duration (B) free float
(C) total float (D) interfering float
99. Due to change in price level, a revised estimate is prepared if the sanctioned estimate exceeds
(A) 2% (B) 3% (C) 4% (D) 5%
100. The detention period in septic tank is assumed as
(A) 20 mins (B) 25 mins (C) 30 mins (D) 35 mins