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PUBLIC WORKS DEPARTMENT

DEPARTMENTAL EXAMINATION OF SECTION ASSISTANT (S.A.) UNDER P.W.D., 2024

ENGINEERING PAPER

(100 MARKS)

Signature of Invigilator _____

CODE NO.

(For Official use)

MARK TABULATION

Question No.	Marks carried by each question	No. of correct answers	Marks
1-100	1		

Signature of Examiner _____

Signature of Scrutiniser _____

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DEPARTMENTAL EXAM FOR SECTION ASSISTANT, 2024
ENGINEERING PAPER

Time allowed : 3 hours   **Full Marks : 100**
                                                             Pass Marks : 40

Choose the correct answer (Each question carries 1 mark)
(Put a tick mark (✔) against the correct answer in the bracket (   )

1.   The dimension in 'mm' for A3 size drawing Sheet is:-
     (a) 841 X 1189   (   )   (b) 297X420   (   )
     (c) C) 420 X 594   (   )   (d) 210 X 297   (   )

2.   Which one of the followings is an enlargement scale?
     (a) 1.2000   (   )   (b) 1.2   (   )
     (c) 1.1   (   )   (d) 50:1   (   )

3.   The type of line recommended to be used for dimension lines in Building Drawing is:-
     (a) Continuous Thin   (   )   (b) Continuous Thick   (   )
     (c) Dashed Thin   (   )   (d) Dashed Thick   (   )

4.   The angular measurement is given by:-
     (a) Chains   (   )   (b) Compass   (   )
     (c) Theodolites   (   )   (d) Both (B) & (C)   (   )

5.   If the representative factor in a drawing is 1/30000, then, 6Km long will be represented by:-
     (a) 10 cm   (   )   (b) 15 cm   (   )
     (c) 20 cm   (   )   (d) 30 cm   (   )

6.   Thickness of partition walls of Building may be seen from:-
     (a) Plan   (   )   (b) Elevation   (   )
     (c) Section   (   )   (d) Both (A) & (C)   (   )

7.   Drawing for Buildings started with:-
     (a) Detail Elevation   (   )   (b) Plan   (   )
     (c) Sectional Drawing at different locations (   )   (d) All of (A), (B) & (C)   (   )

8.   In which of the following, you will show cross section detail of lintel over windows/Doors?
     (a) Plan   (   )   (b) Elevation   (   )
     (c) Section   (   )   (d) All of (A), (B) & (C)   (   )

9.   The overburnt bricks with irregular shape and dark colour should be classed as:-
     (a) First class   (   )   (b) Second class   (   )
     (c) Third class   (   )   (d) Fourth class   (   )

10. Each Bitumen Emulsion drum shall be legibly and indelibly marked with:-
     (a) Source, month and year of manufacture (   )   (b) Type/Grade and Batch number (   )
     (c) Date of Expiry   (   )   (d) All of (A), (B) and (C)   (   )

11. The maximum water-cement ratio for structural purpose cement concrete is:-

    (a) 0.45   ( )   (b) 0.50   ( )
    (c) 0.55   ( )   (d) 0.60   ( )

12. The maximum spacing of main steel in RCC slab is:-
    (a) 300 mm   ( )   (b) 350mm   ( )
    (c) 400mm   ( )   (d) 450mm   ( )

13. Providing proper cover to re-enforcement in RCC members will ensure:-
    (a) Tensile strength   ( )   (b) Durability   ( )
    (c) Deflection condition   ( )   (d) Lateral Stability   ( )

14. The wedge-shape unit fixed at the crown of an Arch is:-
    (a) Key   ( )   (b) Soffit   ( )
    (c) Springer   ( )   (d) Rise   ( )

15. The minimum strength of concrete for structural purpose is:-
    (a) M15   ( )   (b) M20   ( )
    (c) M25   ( )   (d) M30   ( )

16. Which of the following is a shallow type of foundation?
    (a) Caissons   ( )   (b) Pier foundation   ( )
    (c) Pile foundation   ( )   (d) Strap footings   ( )

17. The most suitable foundation for bridge pier among the following is:-
    (a) Combined footing   ( )   (b) Mat foundation   ( )
    (c) Well foundation   ( )   (d) Spread foundation   ( )

18. Which of the following is cohesionless by soil?
    (a) Sand   ( )   (b) Silt   ( )
    (c) Clay   ( )   (d) Silty Peat   ( )

19. The type of door permitting free ventilation but at the same time can maintain privacy is:-
    (a) Wire-Gauged Door   ( )   (b) Flight Doors   ( )
    (c) Louvered Door   ( )   (d) Batten and ledge door   ( )

20. The vertical outside member of the shutter of a door or window is called:-
    (a) Sill   ( )   (b) Head   ( )
    (c) Strut   ( )   (d) Style   ( )

21. The rise of Jack Arch floor is kept equal to:-
    (a) $1/10^{th}$ of the span   ( )   (b) $1/12^{th}$ of the span   ( )
    (c) $1/14^{th}$ of the span   ( )   (d) $1/16^{th}$ of the span   ( )

22. What is the meaning of 12-16Øin structural drawing?
    (a) 12 Nos of 16 mm dia bars   ( )
    (b) 12 mm dia bar16 mm centre to centre   ( )
    (c) Provide bar of 12 mm dia to 16 mm dia   ( )
    (d) Mixing of 12mm & 16mm dia bar   ( )

23. A dots or dashes in Architectural drawings indicate:-
    (a) Discontinuous members ( )
    (b) Something which is not solid ( )
    (c) Small openings ( )
    (d) Something hidden from View Angle ( )

24. Which of the following information is typically not available in structural drawings:-
    (a) Spacing of re-enforcement ( )
    (b) Cross sectional detail of doors ( )
    (c) Effective cover to re-enforcement ( )
    (d) None of (A), (B) & (C) ( )

25. Which of the following information is typically not available in Architecture drawings:-
    (a) Development length ( )
    (b) Recommended foundation dept ( )
    (c) Landscaping ( )
    (d) Space utilization management ( )

26. Which one of the following Indian standard rolled steel section is an I-Section?
    (a) ISHT ( )   (b) ISLC ( )
    (c) ISJB ( )   (d) ISMC ( )

27. Choose an equal angle section from the followings:-
    (a) ISA 75 X 76 X 8mm ( )   (b) ISA 110 X 110 X 16mm ( )
    (c) ISA 45 X 30 X 5mm ( )   (d) ISA 125 X 75 X 10mm ( )

28. An Indian Standard Channel section MC 200 means:-
    (a) Medium weight channel of dept 200 mm ( )
    (b) Medium weight channel of 200 Kg ( )
    (c) Medium weight channel of thickness 200mm ( )
    (d) Medium weight channel of length 200mm ( )

29. The upright member added to strengthen the Queen post truss is:-
    (a) Strut ( )   (b) Tie beam ( )
    (c) Straining beam ( )   (d) Princess Post ( )

30. A timber board used to hold the common rafter forming verge is:-
    (a) Eaves board ( )   (b) Barge board ( )
    (c) Ridge ( )   (d) Jack rafters ( )

31. Which of the following type of roof would be most suitable for Verandah roofing?
    (a) Hip roof ( )   (b) Deck roof ( )
    (c) Gable roof ( )   (d) Lean-to-roof ( )

32. To fix GI sheet roofing , a hole must be drilled at:-
    (a) The crown ( )   (b) The valley ( )
    (c) Mid-point of crown and valley ( )   (d) Always closure to the valley ( )

33. The overall width of GI sheet roofing is:-
(a) 1.0 m   ( )   (b) 1.01 m   ( )
(c) 1.05 m   ( )   (d) 1.10 m   ( )

34. Choose the wrong statement:-
(a) SOR includes 10% Contractor's profit   ( )
(b) SOR can be made up-to- date using cost index   ( )
(c) SOR must always carry year of publication   ( )
(d) SOR must be the same all over the state.   ( )

35. Requirement for the preparation of SOR is:-
(a) Rate analysis   ( )   (b) Deviation Statement   ( )
(c) Expenditure statement   ( )   (d) All of (A), (B) & (C)   ( )

36. The Current Cost Index for MPWD SOR 2019 (Building wells) is:-
(a) 26.13%   ( )   (b) 27.12%   ( )
(c) 26.33%   ( )   (d)27.33%   ( )

37. Choose which of the following is required for analysis of rates of an item:-
(a) Quantity of Material   ( )   (b) Number of labourers needed   ( )
(c) Over heads   ( )   (d) All of (A), (B) & (C)   ( )

38. The basic rate of materials are inclusive of :-
(a) Contractors profit   ( )   (b) Royalty, Taxes etc.   ( )
(c) Overheads   ( )   (d) Carriage   ( )

39. Rocks or boulders which way is quarried or split with crow bars is classified as:-
(a) Hard Rock (Requiring blasting)   ( )
(b) Hard Rock (Blasting Prohibited)   ( )
(c) Soft/Disintegrated rocks (not requiring blasting)   ( )
(d) Hard/Dense soil   ( )

40. Excavation upto 1.5m dept below ground level and depositing excavated-material on the ground which is included in the item of earthwork for various kinds of soil is:-
(a) Lead   ( )   (b) Lift   ( )
(c) Lead & Lift   ( )   (d) Planking and Strutting   ( )

41. While measuring cutting down of trees, girth shall be measured at:-
(a) 1 m above ground level   ( )   (b) 1.2 m above level   ( )
(c) 1.5 m above ground level   ( )   (d) 1.8 m above ground level   ( )

42. A 12m long 12mm dia bar would weight:-
(a) 8.0 Kg   ( )   (b) 9.5Kg   ( )
(c) 10.6Kg   ( )   (d) 12.0 Kg   ( )

43. Volume of one bag (50 Kg) of cement may be taken as:-
(a) $0.000035m^3$ ( )   (b) $0.00035m^3$ ( )
(c) $0.0035m^3$ ( )   (d) $0.035m^3$ ( )

44. Using usual notation, quantity of frustrum of pyramid portion of the foundation footing is calculated as:-
(a) $h/6(A_1+A_2+2Am)$ (   )   (b) $h/6 (A_1+A_2+4Am)$ (   )
(c) $h/8(A_1+A_2+2Am)$ (   )   (d) $h/8(A_1+A_2+4Am)$ (   )

45. The unit of measurement of half brick work is:-
(a) Rm   (   )   (b) m^2 (   )
(c) m^3 (   )   (d) Nos   (   )

46. A tap with an horizontal inlet and a nozzle bent to discharge in a downward direction is:-
(a) Baffles   (   )   (b) Bell mouth   (   )
(c) Elbow   (   )   (d) Bib tap   (   )

47. The system of plumbing in which the waste connection from sinks, baths, work basins and the soil pipes branches are all collected into one main pipeline trap ventilation is called:-
(a) One-pipe system   (   )   (b) Two-pipe system   (   )
(c) Single stack system   (   )   (d) None of (A), (B) & (C)   (   )

48. A white colour plastic type of pipe used in many cold-water plumbing application is:-
(a) CPVC   (   )   (b) UPVC   (   )
(c) PVC   (   )   (d) PE   (   )

49. A depressed or bent fittings in Building sanitary works which prevent foul air or gas to pass through it are called:-
(a) Soil pipes   (   )   (b) Traps   (   )
(c) Floats   (   )   (d) Valves   (   )

50. A covered pit dug generally in the pervious soil which can absorb sewage effluent or discharges is:-
(a) Flushing cisterns   (   )   (b) Water closets   (   )
(c) Septic tank   (   )   (d) Sock Pit   (   )

51. Which of the following is not distance measuring device?
(a) Passometer   (   )   (b) Clinometer   (   )
(c) Odometer   (   )   (d) Pedometer   (   )

52. The process of centering a prismatic compass over the station where bearing is to be taken by dropping a small piece of stone is called:-?
(a) Levelling   (   )   (b) Observing   (   )
(c) Offsetting   (   )   (d) Centering   (   )

53. The difference between back bearing and fore bearing of a compass in order to eliminate local attraction must be:-
(a) 0^0 (   )   (b) 90^0 (   )
(c) 180^0 (   )   (d) 270^0 (   )

54. The process of temporary adjustment of a theodolite includes:-
(a) Setting up   (   )   (b) Levelling up   (   )
(c) Elimination of parallax   (   )   (d) All of (A), (B) & (C)   (   )

55. In survey work of hilly terrain by a method of stepping, tool used to transfer points to the ground is:-
(a) Plumb bob ( ) (b) whites ( )
(c) Laths ( ) (d) Ranging Rods ( )

56. Which of the following will be an obligatory point while surveying road alignment
(a) Bridge site ( ) (b) Intermediate town ( )
(c) Water logged area ( ) (d) All of (A), (B) & (C) ( )

57. Choose the correct sequence of step in surveying of new highway project: -
(a) Reconnaissance survey → Map study → Preliminary survey → Final adjustment ( )
(b) Preliminary survey → Map study → Reconnaissance → Final adjustment ( )
(c) Map study → Reconnaissance → Preliminary survey → Final adjustment ( )
(d) Map study → Preliminary survey → Reconnaissance → Final adjustment ( )

58. The primary operation for formation work in road that provides inspection path for inspection of alignment is:-
(a) Jungle clearance ( ) (b) Trace-cut ( )
(c) Excavation ( ) (d) Blasting ( )

59. Cutting on the hill side on the inner edge of the curve to improve visibility is called:-
(a) Zigs ( ) (b) Ledge ( )
(c) Box cut ( ) (d) Vision berms ( )

60. The minimum stopping sight distance that must be provided for a design speed of 30Km/hr is:-
(a) 30m ( ) (b) 35m ( )
(c) 40m ( ) (d) 45m ( )

61. The reach of the river at the upstream and downstream for ideal location of Bridge site should be:-
(a) Curve ( ) (b) Zig-zag ( )
(c) Straight ( ) (d) None of (A), (B) & (C) ( )

62. The overall cost of bridge can be reduced if the river channel at the proposed bridge site is:-
(a) Narrow ( ) (b) Wide ( )
(c) Low height ( ) (d) Gentle slope ( )

63. Which of the following is not hill roads:-
(a) NH ( ) (b) SH ( )
(c) ODR ( ) (d) None of (A), (B) & (C) ( )

64. The desirable road land width for village roads in built up area is:-
(a) 9m ( ) (b) 12m ( )
(c) 15m ( ) (d) 24m ( )

65. The maximum permissible super elevation for hill roads not bound by snow is:-
(a) 7% ( ) (b) 10% ( )
(c) 12% ( ) (d) 15% ( )

66. Radius of an existing curve at site may be calculated by:-
(a) $Chord/4(offset)^2$ ( ) (b) $4(Chord)^2/offset$ ( )
(c) $(Chord)^2/8offset$ ( ) (d) $8 Chord/(offset)^2$ ( )

67. The minimum radius for inner curve in hair pin bend is:-
(a) 10m ( ) (b) 12m ( )
(c) 14m ( ) (d) 20m ( )

68. Wet sieving method may be done for material which:-
(a) Tend to agglomerate ( ) (b) is very coarse ( )
(c) is very fine ( ) (d) All of (A), (B) & (C) ( )

69. The dry density of soil at site may be determined by:-
(a) Plate load test ( ) (b) Sand replacement method ( )
(c) Standard proctor test ( ) (d) CBR test ( )

70. Which of the following test is used to determine atterbergs limit of soil sample?
(a) Proctor test ( ) (b) SPT ( )
(c) Tri-axial test ( ) (d) Liquid limit test ( )

71. In the process of preparation of dry soil sample for various tests, soil samples as received from the field shall be dried:-
(a) In the air or sun ( ) (b) Always in drying apparatus ( )
(c) By heating in a pan ( ) (d) by blowing air ( )

72. By rolling or tamping , compaction is carried out in soil due to removal of:-
(a) Water ( ) (b) Air ( )
(c) Deleterious material ( ) (d) Organic material ( )

73. A soil which is sticky when wet and become powder when dry is:-
(a) Gravels ( ) (b) Sand ( )
(c) Silt ( ) (d) Clay ( )

74. Liquid limit and plastic limit of soil depends on:-
(a) Clay content ( ) (b) Silt content ( )
(c) Sand content ( ) (d) All of (A), (B) & (C) ( )

75. The soil having the range of particle size less than 0.002mm is:-
(a) Fine sand ( ) (b) Fine silt ( )
(c) Medium silt ( ) (d) Clay ( )

76. The mix design method used for Rigid concrete pavement is:-
(a) Hubbard-Field Method ( ) (b) Hveem mix design method ( )
(c) Marshall mix design method ( ) (d) None of (A), (B) & (C) ( )

77. If there is a blue smoke from the bituminous mix during laying operating it indicates:-
(a) High moisture content ( ) (b) Overheating of mix ( )
(c) High binder content ( ) (d) Excessive fines ( )

78. Tack coat is applied in the construction of flexible pavement:-
(a) To make bituminous layers functions as one ( )
(b) To coat and stabilised loose unbound layer ( )
(c) To protect the base course surface from wet weather ( )
(d) To harden the base course so as to avoid potential damage from construction equipment ( )

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79. The process of application of proper grade of paving bitumen or RS cationic emulsion to a previously prepared surface followed by application of cover aggregate and well rolled is:-
    (a) Pre-mix competing ( ) (b) Mix seal surfacing ( )
    (c) Seal coating ( ) (d) surface dressing ( )

80. A smooth pavement surface having a very low skid resistance is primary due to:-
    (a) Non-uniform application of Bitumen ( )
    (b) Loss of cover aggregates in surface dressing ( )
    (c) Polishing of aggregates under traffic ( )
    (d) Excessive prime coat or tack coat ( )

81. Which of the following is Disintegration types of deflects in flexible pavement :-
    (a) Alligator crack ( ) (b) Ravelling ( )
    (c) Cutting ( ) (d) Fatty surfaces ( )

82. The purpose of sub-base course beneath the cement concrete pavements includes:-
    a) To provide strong supporting layer ( ) (b) To prevent mud-pumping ( )
    (c) To reduce thickness requirement ( ) (d) All of (A), (B) & (C) ( )

83. Tool used to check the finished cement concrete pavement surface in longitudinal direction is:-
    (a) Straight edge ( ) (b) Float ( )
    (c) Vibrating screed ( ) (d) Canvas Belt ( )

84. Dowel bars are used in rigid pavement to :-
    (a) Transfer load between adjacent concrete ( )
    (b) Maintain two slabs at the same height ( )
    (c) Improve performance of joints ( )
    (d) All of (A), (B) & (C) ( )

85. Which of the following is not defect in rigid pavement?
    (a) Mud pumping ( ) (b) Corrugations ( )
    (c) Spalling ( ) (d) Blowups ( )

86. Choose the one which is not a cross-drainage type of drain:-
    (a) Small bridges ( ) (b) Slab culvert ( )
    (c) Cause ways ( ) (d) None of (A), (B) & (C) ( )

87. Provision of 1.50 to 1.80m deep drainage channels close to the road gives satisfactory results in road construction :-
    (a) In areas where the problem is of water lofting alone ( )
    (b) In areas where in addition to water logging, flooding for prolong periods is so expected ( )
    (c) In areas where in addition to water logging, harmful salts are present in the sub soil or ground water ( )
    (d) None of (A), (B) & (C) ( )

88. The general requirement of number of culverts per kilometre in hill roads is:-
    (a) 6 to 8 ( ) (b) 8 to 10 ( )
    (c) 10 to 12 ( ) (d) 12 to 14 ( )

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89. The shape for catch water drain recommended is:-
(a) V-Shape ( )   (b) U-Shape ( )
(c) Trapezoidal Shape ( )   (d) Parabolic Shape ( )

90. The type of cross drainage structure recommended at a location where there is a shallow non-perennial stream with the expected interruption between 12 hr to 24 hrs would be:-
(a) Vented causeway ( )   (b) culvert ( )
(c) Submersible bridge ( )   (d) Ford ( )

91. The expenditure provided for sundries in analysis of rate in general is:-
(a)1% of total rate of item ( )   (b) 1.5% of total rate of item ( )
(c) 2% of total rate of item ( )   (d) 2.5% of total rate of item ( )

92. Choose the factor(S) affecting rate of item from the following:-
(a) Specification of item ( )   (b) Transportation of material ( )
(c) Labour wages ( )   (d) All of (A), (B) & (C) ( )

93. Choose labour required for rate analysis of mild steel re-enforcement for RCC work:-
(a) Mason ( )   (b) Mate ( )
(c) Blacksmith ( )   (d) Painter ( )

94. The unit for wood work in frames of doors, windows etc., is:-
(a) Rm ( )   (b) m^3 ( )
(c) m^2 ( )   (d) Each ( )

95. Weight of round bars in Kg/m may be calculated as, where D is diameter in 'mm':-
(a) $(D)^2/162$ ( )   (b) D/162 ( )
(c) $D^2/169$ ( )   (d) D/169 ( )

96. The requirement of cement for 1 cum of M20 grade cement concrete may be taken, for rate analysis purpose as:-
(a) 6.0 bags ( )   (b) 6.4 bags ( )
(c) 8.0 bags ( )   (d) 8.4 bags ( )

97. Cost of labour component of an item in building work for rough estimation purpose is:-
(a) 30 to 35% of total cost ( )   (b) 65 to 70% of total cost ( )
(c) 80 to 85 percent total cost ( )   (d) 90 to 95% of total cost ( )

98. The number of Brick requirement per sq.mt of Plinth area is:-
(a) 450 nos ( )   (b) 500 nos ( )
(c) 550 nos ( )   (b) 600 nos ( )

99. The unit of measurement for scarifying in road work is:-
(a) Rm ( )   (b) m^2 ( )
(c) m^3 ( )   (d) Nos ( )

100. The Rankine's formula for calculations of thickness of arch in arch culvert is:-
(a) T=0.01R ( )   (b) T=0.012R ( )
(c) T=0.1R ( )   (d) T=0.12R ( )