MIZORAM PUBLIC SERVICE COMMISSION

GENERAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF JUNIOR ENGINEER UNDER PUBLIC WORKS DEPARTMENT
NOVEMBER, 2018

CIVIL ENGINEERING PAPER-II

Time Allowed : 2 hours   Full Marks : 150

All questions carry equal marks of two (2) each. Attempt all questions.

1. Some gases such as Carbon dioxide, Methane, Oxides of nitrogen etc called 'Green house gases' cause a process termed 'Global warming' by :-
   (a) depleting the Ozone layer
   (b) absorbing more heat from the Sun
   (c) preventing escape of heat from the earth
   (d) producing more heat in addition to that received from the Sun

2. An atmospheric inversion occurs over metropolitan arreas under cloudless skies, a haze called 'Smog' can cause :-
   (a) a heavy noise pollution   (b) high irritation to the eyes
   (c) severe disruption in satellite communication (d) None of the above

3. Which one of the followings would be a source reduction process in an integrated solid waste management :-
   (a) Composting   (b) Landfill
   (c) combustion with energy recovery   (d) Less packaging

4. 1 ppm (parts per million) is considered to be equal to :-
   (a) 1 mg/L   (b) 100 mg/L
   (c) 10^3 mg/L   (d) 10^6 mg/L

5. A high concentration of chloride in water can cause :-
   (a) Alkalinity   (b) Acidity
   (c) Salinity   (d) Hardness

6. Choose the most appropriate method of population forecasting in the design of water supply system for a community with a limited land area for further expansion, from the followings :-
   (a) Declining growth method   (b) Uniform pereentage method
   (c) Arithmetic method   (d) Curvilinear method

7. The most reliable method of water distribution system provided the conduit is adequate in size and well safeguarded against accidental breaks, with an exception of fire-fighting would be :-
   (a) Distribution by means of pumps with more or less storage
   (b) Use of pump without storage
   (c) Gravity distribution
   (d) None of these

8. 'Crenothrix' are a group of Bacteria found commonly in :-
   - (a) Rivers
   - (b) Lakes
   - (c) Ponds
   - (d) Ground Water

9. Odors caused by the gases due to organic decomposition in water can partly be removed by :-
   - (a) Chlorination
   - (b) Slow sand filter
   - (c) Aeration
   - (d) Ozonation

10. A provision at suitable locations in sewer systems meant for inspection and cleaning are called :-
    - (a) Regulators
    - (b) Man holes
    - (c) Junctions
    - (d) Traps

11. Which of the followings is a classification of surveying based upon the object of survey?
    - (a) Marine or Navigation survey
    - (b) Photographic and Ariel survey
    - (c) Astronomical survey
    - (d) Archaeological surveys for unearthing relics of antiquity

12. The scale of 1:100 in a map represents :-
    - (a) 1mm = 1m
    - (b) 1cm = 1m
    - (c) 10mm = 1m
    - (d) 5mm = 1m

13. The length of a line measured with a 20m chain was found to be 100m. It was artefwards found that the chain was 10cm too long. The true length of the line is :-
    - (a) 100.50m
    - (b) 100.20m
    - (c) 99.90m
    - (d) 99.50m

14. In Free & Loose needle method of Traversing, bearing of each line is taken with reference to :-
    - (a) The adjacent line
    - (b) Geographical north
    - (c) Magnetic meridian
    - (d) None of the above

15. If the orientation of Runway is such that the fore bearing is 170° (WCB), the back bearing from the other end of the runway will be :-
    - (a) 110°
    - (b) 280°
    - (c) 300°
    - (d) 350°

16. The magnetic declination of a compass needle can be found out approximately from:-
    - (a) Dip of the neddle
    - (b) Isogonic charts
    - (c) The included angles
    - (d) The local attractions

17. If the mean of the final vernier reading of Theodolite in measuring the horizontal angle by direct angles method is 200°, then the value of that angle is :-
    - (a) 100°
    - (b) 180°
    - (c) 200°
    - (d) 400°

18. In levelling activity, the line of sight would be the :-
    - (a) Height of Instrument
    - (b) Plane of collimation
    - (c) Line of collimation
    - (d) Axis of the telescope

19. The length of vertical curve in highway geometry is governed by :
    - (a) Gradient
    - (b) Width of road
    - (c) Superelevation
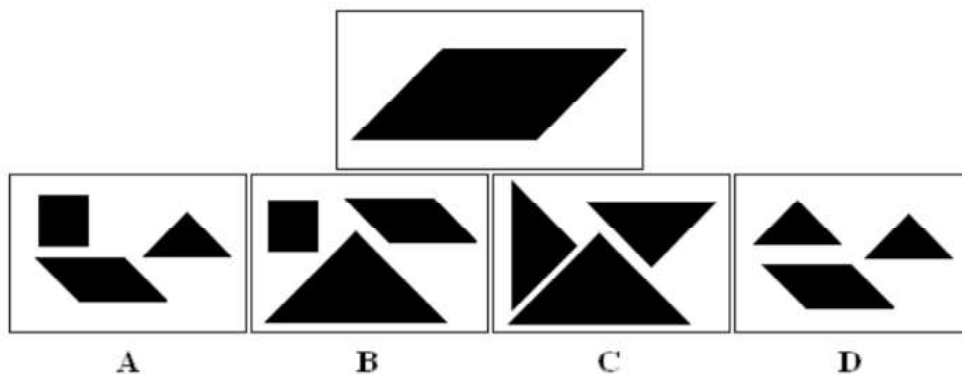   - (d) Sight distance requirement

20. Roadway width pertaining to geometry of highway is :-
   (a) Carriageway
   (b) Carriageway plus shoulders & side drains
   (c) The whole right of way
   (d) None of these

21. The pavement layer usually used as base course without Bitumen in which graded aggregates and granular materials, pre-mixed with water and compacted to a dense mass is :-
   (a) WMM
   (b) WBM
   (c) DLC
   (d) GSB

22. The load carrying capacity of cement concrete pavement is mainly due to :-
   (a) Beam action
   (b) Grain to grain transfer action
   (c) Slab action
   (d) Elasticity action

23. Which of the following is not considered to contribute in the structural strength of pavement :-
   (a) DBM
   (b) OPMC
   (c) BC
   (d) BM

24. Devices or treatments to outline the roadway or a portion there-of to provide visual assistance to drivers about the alignment of a road ahead, especially at night are :-
   (a) Islands
   (b) Kerb markings
   (c) Reflector unit markings
   (d) Delineators

25. Choose the Informatory sign from the following traffic signs :-
   (a) Give way
   (b) Speed limit
   (c) Narrow Bridge
   (d) Compulsory turn left

26. Choose the most correct answer from the followings with regards to steel water tank :-
   (a) Welded tanks are prone to corrosion in short duration as compare to riveted tanks
   (b) The water tanks are invariably designed by limit state method
   (c) As per Indian standard code, liquid weight are to be treated as dead load
   (d) None of these

27. Steel tanks commonly used for storage of petroleum products are :-
   (a) Rectangular tanks
   (b) Square tanks
   (c) Cylindrical tanks
   (d) Pressed steel tanks

28. Which of the following compression members is subjected to insignificant bending :-
   (a) Struts
   (b) Columns
   (c) Rafters
   (d) None of these

29. The crushing (Yielding) modes of failure may occur in the case of :-
   (a) Long columns
   (b) Very short columns
   (c) Both (a) & (b)
   (d) None of these

30. The buckling stress of compression steel member is :-
   (a) Directly proportional to slenderness ratio
   (b) Directly proportional to the square of slenderness ratio
   (c) Inversely proportional to slenderness ratio
   (d) Inversely proportional to the square of slenderness ratio

31. In the process of welding steel which has the ductile character, can partly retain its ductility at the joints provided :-

    (a) The cooling is rapid   (b) The heating is rapid

    (c) The cooling is slow   (d) The heating is slow

32. The length of weld given as 120(200) in the case of intermittent welds implies :-

    (a) 200mm weld and 120mm unweld   (b) 120mm weld and 200mm unweld

    (c) 200cm weld and 120cm unweld   (d) 120cm weld and 200cm unweld

33. The material used for making rivets is :-

    (a) Wrought Irons   (b) Cast Irons

    (c) Aluminium   (d) Mild steel

34. Which of the following type of rivets has the highest strength?

    (a) Power driven shop rivets   (b) Power driven field rivets

    (c) Hand driven rivets   (d) Cold driven rivets

35. Which of the following is/are neglected in the assumption of theory of riveted joints?

    (a) Friction between plates   (b) Bending stress in rivets

    (c) Both (a) & (b) are neglected   (d) None of these

36. Which of the following structural steel section has the highest radius of gyration?

    (a) Single angle section   (b) Circular section

    (c) I – Section   (d) Channel section

37. Slip factor in the bolted joint is defined as :-

    (a) (Shear force to cause slip) / (Clamping force)

    (b) (Load at slip of joint) / (Allowable load)

    (c) (Shear force to cause slip) / (load at slip of joint)

    (d) (Clamping force) / (Allowable load)

38. The nut in a bolt is ensured of full coverage with threads because :

    (a) connection is designed to resist vibration

    (b) this will prevent noise production at the joints

    (c) threads of bolts are not normally permitted in the shear zone

    (d) None of these

39. The most suitable type of weld joint for two elements meeting at 90 degree would be :-

    (a) Butt   (b) plug or Slot

    (c) Bead or Edge   (d) Fillet

40. If the nominal diameter of a rivet is 27mm, its gross diameter is :-

    (a) 28.50mm   (b) 29.00mm

    (c) 29.50mm   (d) 30mm

41. Choose the correct formula for computation of cross-sectional area using simpson's rule where 'd' = the common distance between the ordinates, and 'O' are the ordinates :-

    (a) $d\{(O_0+O_n)/2 + O_1+O_2+.........+O_{n-1}\}$

    (b) $d/2\{(O_0+O_n)/2 + O_1+O_2+.........+O_{n-1}\}$

    (c) $d/3\{(O_0+2\,O_1+4O_2+2O_3...........+ 4O_{n-2}+2O_{n-1}+ O_n \}$

    (d) $d/3\{(O_0+4\,O_1+2O_2+4O_3...........+ 2O_{n-2}+4O_{n-1}+ O_n \}$

42. Additional length required for two bent-ups in beam or slab re-inforcement may be calculated as 0.9d, where 'd' equals to :-

(a) Angle made by the bent-ups with horizontal plane of beam or slab

(b) Total depth of beam or slab minus bottom and top covers

(c) Diameter of bent-up bars

(d) Spacing of bent-up bars

43. The quantity of Trapezoidal portion of RCC footing excluding steel and its bending, where A_1=Top area, A_2=Bottom area, A_m= Average area of top and bottom and h= thickness, may be calculated as:-

(a) $h/3 (A_1+A_2+4A_m)$ (b) $h/6 (A_1+A_2+3A_m)$

(c) $h/3 (A_1+A_2+2A_m)$ (d) $h/6 (A_1+A_2+4A_m)$

44. If the item of work is two or more coats of white washing of external wall, the quantity to be considered for cost estimate will be :-

(a) Gross surface area of external wall

(b) Gross surface area of external wall multiplied by number of coats

(c) Net surface area of external wall

(d) Net surface area of external wall multiplied by number of coats

45. The thickness of Brick wall up to and including three bricks in thickness shall be measured :-

(a) in multiple of half brick (b) in multiple of one brick

(c) in multiple of one and a half brick (d) in actual thickness

46. Pieces of sawn timber whose cross-sectional dimensions exceed 50mm in both directions and do not exceed 200mm in both directions are :-

(a) Battens (b) Scantlings

(c) Baulks (d) Planks

47. The nominal lift considered in measurement of earthwork is :-

(a) 1.5m (b) 1.8m

(c) 25m (d) 30m

48. Choose the item from the followings whose unit of measurement is in 'Meter' :-

(a) Thin partition wall (b) DPC

(c) Half Brick work (d) Coping (projection specified)

49. Which of the following item of work is usually not measured separately?

(a) Soling (b) Excavated earth used in plinth filling

(c) Lintel over opening (d) Cornice

50. If the height of earth filling in plinth is 90cm and height of sand filling is 30m, then the quantity of sand filling in plinth will be :-

(a) (2X Quantity of earth filling) (b) (3X Quantity of earth filling)

(c) (1/2X Quantity of earth filling) (d) (1/3X Quantity of earth filling)

51. Choose the correct relation from the following with regards to valuation of real property :-

(a) Net income = Gross income - Outgoings (b) Net income = Gross income + Outgoings

(c) Gross income = Net income - Outgoings (d) None of the above

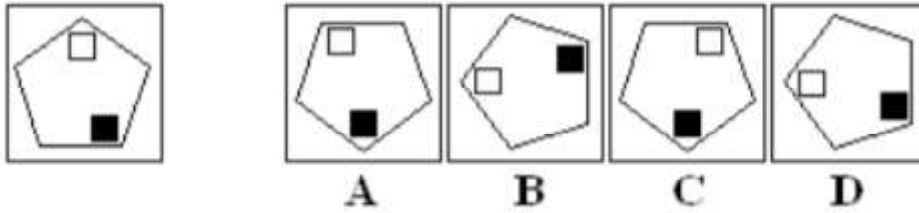**52.** The value of property at the end of the utility period without being dismantled is :-

    (a) Book value   (b) Scrap value

    (c) Salvage value   (d) Rateable value

53. The capitalised value of a property fetching a net annual rent of Rs 2000.00 with a highest prevailing rate of interest of 5% is :-

    (a) Rs 100.00   (b) Rs 2,100.00

    (c) Rs 20,000.00   (d) Rs 40,000.00

54. Choose the item not considered in the calculation of Sinking fund for a building from the followings:-

    (a) Life of the building   (b) Cost of land

    (c) Scrap value of old materials   (d) None of the above

55. For simplicity, the requirement of trench filling quantity may be taken as :-

    (a) ½ of earth work in excavation   (b) 1/3 of earth work in excavation

    (c) 1/4 of earth work in excavation   (d) 1/5 of earth work in excavation

56. Which of the following is not covered under the contract of indemnity?

    (a) Loss occasioned by the conduct of the promisor

    (b) Loss occasioned by the conduct of the promisee

    (c) Loss occasioned by the conduct of other person

    (d) None of these

57. Who among the followings is not a party in contract of guarantee?

    (a) Agent   (b) Surety

    (c) Principal debtor   (d) Creditor

58. Among the following remedies for breach of contract ,a genuine covenanted pre-estimate of damages is :-

    (a) Suit on Quantum meruit   (b) Penalty

    (c) Liquidated damage   (d) Injunction

59. Substitution of a new contract for the original one either between the same parties or between different parties is:-

    (a) Remission   (b) Novation

    (c) Alteration   (d) Rescission

60. Choose the incorrect statement from the followings in relation to the law of contracts :-

    (a) It does not lay down so many precise rights and duties which the law will protect and enforce

    (b) It contains a number of limiting principles, subject to which the parties may creat rights and duties for themselves

    (c) The parties to a contract in a sense make the law for themselves

    (d) All the above statements are correct

61. Which of the followings is not included in the analysis of rate of an items?

    (a) Contractor's profit   (b) Contingencies

    (c) Cost Index   (d) Work charged establishment

62. Schedule of works is framed by the Department based on :-

    (a) Administrative approval   (b) Budget provision

    (c) Expenditure sanction   (d) Estimated amount

63. One can easily understand the nature of the work and what the work shall be from the study of :-
    (a) Specifications   (b) Schedule of Rates
    (c) Bill of Quantities   (d) Drawings

64. The amount deposited by the contractor to the department as guarantee of tender so that the contractor may not refuse to accept the work or run away if his tender is accepted is :-
    (a) Security deposit   (b) Performance Guarantee
    (c) Earnest money   (d) Mobilization advance

65. All measurements of works or supply should be directly entered in the Measurement Book :-
    (a) in pencil   (b) in ink
    (c) in pencil first and inked over after finalisation   (d) none of these

66. From the following series of numbers, find out the incorrect number: 6, 8, 13, 40, 161, 806, 4837
    (a) 161   (b) 40
    (c) 13   (d) 8

67. Fill in the blank: $34 \times 14 - 234 - 86 = 126 + $ _____
    (a) 20   (b) 60
    (c) 30   (d) 40

68. From the below options, choose the word which is <u>most opposite</u> in meaning to the word 'HURRIEDLY'
    (a) Sickly   (b) Fast
    (c) Quickly   (d) Leisurely

69. From the options given below, select the word that has been correctly spelled-
    (a) Obfuscate   (b) Diggression
    (c) Agrravate   (d) Decieved

70. From the options given below, select the alternative which is the best substitute for the phrase, "Courteousness and refinement of manner"
    (a) Plaudit   (b) Profanity
    (c) Gentility   (d) Adulation

71. Which group of shapes can be assembled to make the shape shown on the top?

    (a) A   (b) B
    (c) C   (d) D

72. Which figure is identical to the first on the left but has been rotated?

    (a) A   (b) B

    (c) C   (d) D

73. Fill in the missing letters from the options given below- PRT: KMO : : JLN: ?

    (a) EGI   (b) DFI

    (c) DFH   (d) DGI

74. If GREEN is called BLACK, BLACK is called BLUE, BLUE is called RED, RED is called WHITE and WHITE is called ORANGE; what is the colour of fresh blood?

    (a) White   (b) Blue

    (c) Orange   (d) Black

75. If 'P' means 'Multiply', 'Q' means 'Divide', 'R' means 'Add' and 'S' means 'Subtract' then what is the value of 544Q32R13P7S18?

    (a) 108   (b) 90

    (c) 118   (d) 192

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