



FAR WESTERN UNIVERSITY
Faculty of Engineering
Mahendranagar, Kanchanpur, Nepal
[MSc CPM Entrance Examination 2080]

Full Marks: 100
Time: 2 hours

Attempt all questions:

Read the following questions and write down the correct option A, B, C, or D in the answer sheet provided. Each question carries 1 (one) mark.

1. If the ratio of men to women in a particular dormitory is 5:3, which of the following could not be the number of residents in the dormitory?
 (A) 24 (B) 40 (C) 96 (D) 150
2. If 25 students took an exam and 4 of them failed, what percent of them passed?
 (A) 21% (B) 42% (C) 84% (D) 96%
3. If $3a + 5b = 10$ and $5a + 3b = 30$, what is the average (arithmetic mean) of a and b ?
 (A) 1.5 (B) 2.5 (C) 3 (D) 4
4. What is the maximum area of the rectangle with perimeter 620 mm?
 (A) $24,025 \text{ mm}^2$ (B) $22,725 \text{ mm}^2$ (C) $24,000 \text{ mm}^2$ (D) $24,075 \text{ mm}^2$
5. If 15 workers can do a job in 24 days, how many days will 40 workers take to do the same job working at the same rate?
 (A) 6 (B) 9 (C) 15 (D) 24
6. What is the surface area of a cube whose volume is 64?
 (A) 16 (B) 64 (C) 96 (D) 128
7. Two acute angles in a right-angled triangle are in the ratio of 2:7. What is the measure of larger angle?
 (A) 40° (B) 50° (C) 60° (D) 70°
8. If $x^2 - y^2 = 32$ and $x - y = 4$, what is the average value of x and y ?
 (A) 4 (B) 3 (C) 2 (D) 1
9. If 3 pieces of chocolates costs \$ 0.50, how many chocolates can you buy for \$10?
 (A) 20 (B) 40 (C) 60 (D) 80
10. What is the ratio of the circumference of a circle to its radius?
 (A) $\frac{\pi}{2}$ (B) $\sqrt{\pi}$ (C) π (D) 2π
11. Find relation between a and b such that the following limit is got after a single application of L'hospital's Rule $\lim_{x \rightarrow 0} \frac{ae^x + be^{2x}}{be^x + ae^{2x}}$
 (A) $\frac{b}{a} = 2$ (B) $\frac{a}{b} = 2$ (C) $a = b$ (D) $a = -b$
12. If l, m, n are the direction cosines of a position vector \vec{a} , then which of the following is true?
 (A) $l^2 + m^2 - n^2 = 0$ (B) $lmn = 1$ (C) $l^2 + m^2 + n^2 = 1$ (D) $l^2 m^2 + n^2 = 1$
13. The quantity $y = mx + c$ represents a
 (A) Circle (B) Straight line (C) Parabola (D) None of these

14. A dealer bought a mobile for \$ 900 and later sold it for \$ 1,260. By what percent did the value of mobile increase?
 (A) 40% (B) 35% (C) 30% (D) 25%
15. Solution of the differential equation $\frac{dy}{dx} + y \cot x = \cos x$ is
 (A) $y \cos x = \frac{\sin^2 x}{2} + c$ (B) $y \sin x = \frac{\sin^2 x}{2} + c$ (C) $y \sin x = \frac{\cos^2 x}{4} + c$ (D) $y \cos x = -\frac{\sin^2 x}{4} + c$
16. Indira solved 24 math problems in 15 minutes. At this rate, how many problems can she solve in 40 minutes?
 (A) 40 (B) 48 (C) 60 (D) 64
17. If $4^a \times 4^b = 4^{200}$, what is the average of a and b?
 (A) 50 (B) 100 (C) 150 (D) 200
18. Which of the following is the adjoint of the matrix $A = \begin{bmatrix} 1 & 5 \\ 3 & 4 \end{bmatrix}$?
 (A) $\begin{bmatrix} 4 & -5 \\ -3 & -1 \end{bmatrix}$ (B) $\begin{bmatrix} -4 & 5 \\ -3 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 4 & -5 \\ -3 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 4 & 5 \\ -3 & 1 \end{bmatrix}$
19. What is the area of a rectangle whose length is twice its width and whose perimeter is equal to that of a square whose area is 1?
 (A) 6 (B) $\frac{2}{3}$ (C) $\frac{4}{3}$ (D) $\frac{8}{9}$
20. If $\frac{1}{a} = \frac{1}{b} + \frac{1}{c}$, what is a in terms of b and c?
 (A) $\frac{ab}{a+b}$ (B) $\frac{bc}{b+c}$ (C) $\frac{ac}{a+c}$ (D) None of these
21. If x% of y is 10, what is y?
 (A) $10/x$ (B) $100/x$ (C) $1000/x$ (D) $x/10$
22. What is the sum of the product and quotient of 7 and 7?
 (A) 47 (B) 48 (C) 49 (D) 50
23. If $2^x = 32$, what is x^2 ?
 (A) 5 (B) 10 (C) 25 (D) 100
24. What is the value of $\frac{6!}{8!}$?
 (A) $1/56$ (B) $1/48$ (C) $1/8$ (D) $3/8$
25. If $x^2 - y^2 = 28$ and $x - y = 8$, what is the average of x and y?
 (A) 1.75 (B) 3.5 (C) 7 (D) 8
26. The process of determining the locations of the instrument station by drawing resectors from the location of the known stations is called.....
 (A) Intersection (B) Radiation (C) Resection (D) Traversing
27. The bearing of lines AB is $152^\circ 30'$ and angle ABC measured clockwise is $124^\circ 30'$. The bearing of BC is
 (A) $25^\circ 00'$ (B) $95^\circ 00'$ (C) $148^\circ 00'$ (D) $190^\circ 00'$
28. If the reduced bearing of a line is $N87^\circ W$, its whole circle bearing is
 (A) 3° (B) 87° (C) 93° (D) 273°
29. If the angular measurements of a traverse are more precise than its linear measurements, balancing of the traverse, is done by

- (A) Bowditch's rule (B) Transit rule (C) Empirical rule (D) None of these
30. If the R.L. of a B.M. is 100 m, the back sight is 1.215 m and the foresight is 1.870 m, the R.L. of the forward station is
(A) 99.345 m (B) 100.345 m (C) 100.655m (D) 101.870
31. The first reading from a level station is....
(A) Foresight (B) Intermediate sight (C) Backsight (D) Any sight
32. Reciprocal levelling eliminates
(A) Collimation error (B) Error due to earth's curvature
(C) Error due to atmospheric refraction (D) All of these
33. The rocks which are formed by gradual deposition, are called
(A) Sedimentary rocks (B) Igneous rocks (C) Metamorphic rocks (D) None of these
34. Sandstone is.....
(A) Igneous rock (B) Sedimentary rock (C) Metamorphic rock (D) Volcanic rock
35. Most commonly used solvent in oil paints is.....
(A) Petroleum (B) Spirit (C) Coaltar (D) Turpentine
36. Stone to be used for rubble masonry must be
(A) Hard (B) Soft (C) Light (D) Heavy
37. The base material for distemper is....
(A) Lime (B) Lime putty (C) Cement wash (D) Chalk
38. The most fire-resistant paint is.....
(A) Enamel paint (B) Aluminum paint (C) Asbestos paint (D) Cement paint
39. The frog of a brick is normally made on its...
(A) Top face (B) bottom face (C) Longer face (D) Shorter face
40. The raw material in the manufacture of cement is.....
(A) Basalt (B) Slate (C) Limestone (D) Sandstone
41. Slump test for concrete is carried out to determine
(A) Strength (B) Durability (C) Workability (D) Water content
42. The damp proof course is measured in.....
(A) Meter (B) Square meter (C) Cubic meter (D) None of these
43. The weight of 16 mm diameter mild steel bar per meter length is equal to.....
(A) 0.62 kg (B) 0.89 kg (C) 1.58 Kg (D) 2.35 kg
44. The technique of finding the fair price of an existing building is known as.....
(A) Estimation (B) Valuation (C) Pricing (D) Costing
45. The approximate weight of one cubic meter mild steel is.....
(A) 2,400 kg (B) 4,600 kg (C) 7,850 kg (D) 10,000 kg
46. If B is the width of formation, d is the height of the embankment, side slope S:1, for a highway with no transverse slope, the area of cross-section is.....
(A) $B + d + Sd$ (B) $Bd + Sd^2$ (C) $Bxd - Sd^2$ (D) $(Bd + Sd^2)/2$
47. Cohesionless soil is
(A) Sand (B) Silt (C) Clay (D) None of these
48. The liquid limit and plastic limit exists in.....
(A) Sandy soil (B) Silty soil (C) Gravel soil (D) Clay soil

49. The property of a soil which permits water to percolate through it is called
 (A) Moisture content (B) Permeability (C) Capillarity (D) None of these
50. The vane shear test is used for the in-situ determination of the undrained strength of the intact fully saturated
 (A) Sands (B) Gravels (C) Clays (D) Highly organic soils
51. The active earth pressure of a soil is proportional to.....
 (A) $\tan(45^\circ - \theta)$ (B) $\tan^2(45^\circ + \theta)$ (C) $\tan^2(45^\circ - \theta)$ (D) $\tan(45^\circ + \theta)$
52. Which one of the following is not an excavating and moving type of equipment?
 (A) Bulldozer (B) Clam shell (C) Scraper (D) Dump truck
53. The artificial activity which indicates that an activity following it, cannot be started unless the preceding activity is complete, is known as
 (A) Event (B) Free float (C) Dummy (D) None of these
54. Free float (FF) is the maximum amount of time an activity can be delayed without delaying the early start of any of its followers. FF is obtained by
 (A) $FF = EF_j - ES_i - D$ (B) $FF = ES_j - ES_i - D$ (C) $FF = EF_i - ES_i + D$ (D) $FF = EF_j - ES_i + D$
55. If t_o , t_p and t_L represent the optimistic, pessimistic, and most likely time estimates, the expected time of completion of the activity is
 (A) $t_E = \frac{t_o + t_L + t_p}{3}$ (B) $t_E = \frac{t_o + 2t_L + t_p}{4}$ (C) $t_E = \frac{t_o + 3t_L + t_p}{5}$ (D) $t_E = \frac{t_o + 4t_L + t_p}{6}$
56. In CPM, the critical path represents the
 (A) Shortest path for the earliest completion of the project
 (B) Longest path of the network for the earliest completion of the project
 (C) Ideal path for the earliest completion of the project
 (D) None of the above
57. Program Evaluation and Review Technique (PERT) analysis is based on..
 (A) Optimistic time (B) Pessimistic time (C) Most likely time (D) All of these
58. Which of these is not the constraint of a project....
 (A) Scope (B) Resources (C) Team (D) Budget
59. The process that evaluates project performance to provide confidence is called
 (A) Quality assurance (B) Quality planning (C) Quality control (D) Quality audit
60. Bar charts are suitable for...
 (A) Mega projects (B) Large projects (C) Medium projects (D) Small projects
61. Tender document includes, except
 (A) Conditions of contract (B) Bill of quantities (C) Valid agreement (D) Specification
62. Chairperson of construction material rate fixation committee is
 (A) Chairperson of District Coordination Office (B) Chief District Officer
 (C) Chief Executive Officer (D) Chief Communication Officer
63. An employer must take the responsibility for the wrongdoing by his employee even though he has not committed that mistake is
 (A) Vicarious liability (B) Negligence (C) Tort (D) None of these
64. Which of the following is not a profession?
 (A) Engineering (B) Law (C) Medicine (D) Teaching
65. Accepted principles of right or wrong governing the conduct of engineers is called...
 (A) Engineering values (B) Engineering conduct (C) Engineering ethics (D) Engineering principles

66. Which is NOT a professional style?
 (A) Ethical (B) Emotional (C) Responsible (D) Intellectual
67. What is the process to resolve disputes?
 (A) Mediation (B) Adjudication (C) Litigation (D) All of these
68. What is the market situation where there are many buyers and single seller?
 (A) Perfect competition (B) Oligopoly (C) Monopoly (D) None of these
69. Capitalized cost of a project is also known as.....
 (A) Infinite cost (B) Life cycle cost (C) Life cost (D) Project cost
70. Firm's liquidity can be judged by ...
 (A) Acid test ratio (B) Liquidity ratio (C) Current ratio (D) Debt ratio
71. The additional money received from selling the one or more unit at specified level of output is.....
 (A) Equivalent revenue (B) Marginal revenue (C) Average revenue (D) None of these
72. A uniform series of payment occurring at equal interval of time is called.....
 (A) Annuity (B) Amortization (C) Depreciation (D) Bond
73. The unknown incidental cost incurred in any project is called
 (A) Work charged establishment (B) Overhead cost (C) Supervision cost (D) Contingency
74. What refers to the amount of money paid for the use of borrowed capital..
 (A) Simple interest (B) Interest (C) Rate of interest (D) Principal
75. If interest is paid more than once in a year. "i" is the rate of interest per year. "n" is the number of periods in years and "m" is a compounding periods per year. Compounded amount factor is
 (A) $(1+\frac{1}{m})^{1/n}$ (B) $(1+\frac{1}{m})^{1/m}$ (C) $(1+\frac{1}{m})^m$ (D) $(1+\frac{1}{m})^n$
76. The lateral deflection of a beam shall not exceed.....
 (A) $\frac{1}{250}$ of the span (B) $\frac{1}{350}$ of the span (C) 10 mm (D) 25 mm
77. If Q is load factor, S is the shape factor and F is factor of safety in elastic design, which relation is correct?
 (A) $Q = S + F$ (B) $Q = S - F$ (C) $Q = F - S$ (D) $Q = F \times S$
78. If the modular ratio is m, steel ratio is r, and overall depth of a beam is d, the depth of the critical neutral axis of the beam, is?
 (A) $\frac{m}{m-r} d$ (B) $\frac{m}{m+r} d$ (C) $\frac{m+r}{m} d$ (D) $\frac{r-m}{m} d$
79. The ratio of the lateral strain to linear strain is called.....
 (A) Modulus of elasticity (B) Modulus of rigidity (C) Poisson's ratio (D) Bulk modulus
80. The diameter of longitudinal bars of a column should never be less than
 (A) 8 mm (B) 10 mm (C) 12 mm (D) 16 mm
81. When load is transferred through one surface to another surface in contact, the stress is known as...
 (A) Compressive stress (B) Shearing stress (C) Working stress (D) Tensile stress
82. Bitumen, stone chips and sand are mixed in asphalt concrete paver at a temperature of
 (A) 100° to 120° (B) 120° to 140° (C) 140° to 160° (D) 150° to 170°
83. In water bound macadam roads, binding material used, is.....
 (A) Stone dust (B) Sand (C) Brick dust (D) Cement

84. The wall constructed for the stability of an excavated portion of a road on the hill side, is known as
(A) Retaining wall (B) Breast wall (C) Parapet wall (D) None of these
85. When upgrade meets a down grade, the vertical curve provided in a highway is known as
(A) Valley curve (B) Sag curve (C) Summit curve (D) None of these
86. If the elevations along a road increase, the slope of the road along the longitudinal direction, is known as.....
(A) Positive grade (B) Negative grade (C) Grade (D) Gradient
87. The tangent length “T” of a simple circular curve of radius “R” deflecting through Δ is
(A) $T = R \sin \Delta$ (B) $T = R \tan \Delta$ (C) $T = R \sin \Delta/2$ (D) $T = R \tan \Delta/2$
88. The full width of land acquired before finalizing a road, is
(A) Formation width (B) Right of way (C) Carriage way (D) Roadway
89. Which of the following is a method used for predicting flood hydrographs?
(A) Hyetograph (B) Unit hydrograph (C) Normal hydrograph (D) Crest method
90. Surface water is obtained from
(A) Its intensity (B) Its duration (C) Its frequency (D) All of these
91. The rainfall at any place is described by
(A) Well (B) Springs (C) Artesian well (D) Rain
92. A unit hydrograph is a hydrograph of a rainstorm of a specified duration resulting from a runoff of
(A) 15 mm (B) 20 mm (C) 25 mm (D) 30 mm
93. The earthen embankments constructed parallel to the river banks at some suitable distance for flood control, is known as
(A) Flood wall (B) River wall (C) Dyke (D) None of these
94. Pressure relief valves are provided in water mains
(A) To reduce pressure (B) At low points (C) Upstream of sluice (D) All of these
95. A manhole is generally provided at each
(A) Change of diameter (B) Junction (C) Bend (D) All of these
96. Carbonates in water produce ...
(A) Permanent hardness (B) Temporary hardness (C) Alkalinity (D) Acidity
97. The sludge does not contain wastewater from
(A) Bathrooms (B) Toilets (C) Wash basins (D) Kitchen sinks
98. 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
99. 5 days-biochemical oxygen demand (BOD5) is taken at a temperature of
(A) 0°C (B) 15°C (C) 20°C (D) 25°C
100. The best practice of disinfection of public water supply is by
(A) Boiling (B) Chlorination (C) Adding lime (D) Adding ozone