

Nepal Engineering Council Registration Examination
Model Question for Hydropower Engineering (AHyE)

Section A (60*1 = 60)

1. Modulus of elasticity is the stress when applied in a member will double the length due to
 - a) change in length = original length
 - b) change in length = twice of original length
 - c) final length = original length
 - d) final length = half of original length
2. Profound lumps of cement in a bag shall be confirmed instantly before its use by
 - a) consistency test
 - b) soundness test
 - c) freshness test
 - d) setting time test
3. Non-load bearing (e.g. compound wall) is generally constructed using stones in
 - a) ashlar fashion
 - b) coursed rubble
 - c) uncoursed rubble
 - d) chamfered ashlar
4. A body will appear mirror image with respect to
 - a) elastic neutral axis
 - b) plastic neutral axis
 - c) axis of symmetry
 - d) neutral axis and axis of symmetry
5. If a topographic map is prepared with 5m contour interval, then index contour is generally shown at
 - a) every 5th contour
 - b) every 3rd contour
 - c) every 10th contour
 - d) every 7th contour
6. Valuation of a currently running Bhat Bhateni supermarket shall be carried out more precisely by..... methods of valuation
 - a) plinth area
 - b) capitalized worth

- c) depreciated
 - d) development
7. Which of the following property of soil is known for index property
- a) size of particle
 - b) shape of particle
 - c) thixotropy
 - d) shape and size of particle
8. Compaction and consolidation are different because of
- a) intensity of load applied
 - b) equipment used for loading purpose
 - c) expulsion of either air particle or water particle
 - d) either reduction of void ratio or increasing density of soil
9. A pure sand has its shear strength due to
- a) ϕ
 - b) C
 - c) C and ϕ
 - d) void ratio of sand
10. For construction of bridge pier, precise soil test shall be carried out by taking sample through
- a) digging a pit
 - b) direct shear test
 - c) sand piling
 - d) standard split spoon sample
11. Shallow foundation is different from deep foundation in many aspects, one of the prominent aspects is
- a) it has low depth
 - b) it has wider width
 - c) worker can enter purposefully
 - d) only used in building construction
12. One of the greatest merits of raft foundation is
- a) easier to construct than deep foundation
 - b) stronger than deep foundation
 - c) avoids unequal settlements
 - d) avoids unnecessary costs for soil tests

13. A liquid of specific gravity 0.8 is heavier than water by -----
- a) 1.0
 - b) 0.8 m
 - c) 0.4 m
 - d) 1.6 m
14. Working principle of hydraulic lift is based on
- a) Bernoulli's principle
 - b) Archimedes' principle
 - c) Pascal's Law
 - d) Newton's Law
15. Bernoulli's equation is derived from
- a) Kepler
 - b) Laplace
 - c) Euler
 - d) Poisson
16. Moody's diagram for estimating head loss was originally developed for
- a) Circular pipes
 - b) Rectangular pipes
 - c) Trapezoidal pipes
 - d) Semi-circular pipes
17. If the flow parameters remain constant at any section along the flow at a particular instant of time, then flow is known as flow
- a) steady
 - b) unsteady
 - c) uniform
 - d) nonuniform
18. The instrument used for measuring evaporation is
- a) hygrometer
 - b) evaporimeter
 - c) lysimeter
 - d) luxmeter
19. A vertical sleeve support can have number of induced reactions
- a) 1
 - b) 2

- c) 3
 - d) 4
20. Torque required to be applied in a shaft with increased length will be for the same amount of twist
- a) increased
 - b) decreased
 - c) constant
 - d) doubled
21. According to Euler's theory, the critical load is
- a) directly proportional to flexural rigidity
 - b) inversely proportional to flexural rigidity
 - c) inversely proportional to length of column
 - d) directly proportional to square of length of column
22. Which of the following method is best suited to calculate the slope at supports of simply supported beam (SSB) loaded with central concentrated load
- a) real work method
 - b) strain energy method
 - c) slope deflection method
 - d) unit load method
23. For the influence line diagram (ILD) drawn for shear force at any section ('a' unit far from left support) in a simply supported beam of 'L' span, the ratio of maximum positive ordinate to maximum negative ordinate will be
- a) $(a/L) - 1$
 - b) $(L/a) + 1$
 - c) $(a/L) + 1$
 - d) $(L/a) - 1$
24. In Muller Breslau principle, the deflection shape of structure due to applied unit force resembles the shape of influence line diagram in some scale, the scale factor is
- a) amount of deflection at any point along deflected curve
 - b) amount of deformation which was intentionally created
 - c) amount of slope at any point along deflected curve
 - d) amount of shear force at any point along the conjugate beam
25. Load combinations are the loadings formed by the of the independent loading conditions.
- a) Linear combination

- b) Non-linear combination
 - c) Exponential functions
 - d) Binary functions
26. Slump test of concrete is conducted to determine the
- a) Strength
 - b) Workability
 - c) Soundness
 - d) Durability
27. Which of the following statement is the most appropriate?
- a) beam is designed in compression and checked for shear
 - b) beam is designed in shear and checked for bending
 - c) beam is designed for bending and checked for shear
 - d) beam is designed for bending and checked for torsion
28. According to IS 456:2000, $E_c = 500\sqrt{f_{ck}}$, where E_c represents
- a) long term static modulus of elasticity of concrete in N/mm^2
 - b) short term static modulus of elasticity of concrete in KN/m^2
 - c) short term static modulus of elasticity of concrete in N/mm^2
 - d) long term static modulus of elasticity of concrete in KN/m^2
29. Which of the following members can resist axial compression?
- a) strut
 - b) tie
 - c) beam
 - d) cable
30. According to national building code (NBC) 202:2015, maximum unsupported length of long wall between cross walls shall be limited to
- a) 4.0 m
 - b) 4.5 m
 - c) 5.0 m
 - d) 5.5 m
31. Among the hydropower plants given below,is not a peaking-ROR type.
- a) Kaligandaki A
 - b) Marsyangdi
 - c) Kulekhani-1
 - d) Upper Tamakoshi

32. If head remains constant, maximum installed capacity will be estimated withQ% (or discharge corresponding to percentage of time exceedance).
- 20%
 - 30%
 - 40%
 - 70%
- ans) a
33. The Upper Tamakoshi hydroelectric project, which is under construction, will have an installed capacity of -----
- 546 MW
 - 564 MW
 - 456 MW
 - 654 MW
34. ----- is not a consideration for site selection of hydroelectric power plant.
- rocky land
 - sedimentation
 - large catchment area
 - availability of water
35. Which element of hydroelectric power plant prevents the penstock from water hammer phenomenon?
- valves and gates
 - draft tubes
 - spillway
 - surge tank
36. What is the right sequential order for Power development nowadays in case of Nepal?
- PPA-survey license- Testing and commissioning -financial closure
 - Survey license -PPA-financial closure-Testing and commissioning
 - Financial closure-survey license-PPA-Testing and commission
 - PPA-financial closure -Survey license-Testing and commissioning
37. In DC Generator, function of Commutator is to
- Convert AC Voltage to DC Voltage
 - Control the Speed of Armature
 - Control the Direction of Current flow in external circuit
 - Convert DC Voltage to AC Voltage
38. How can we increase reactive power supplied by Synchronous Generator?
- By decreasing excitation current to Rotor
 - By increasing excitation current to Rotor
 - By increasing turbine input

- d) By decreasing turbine input
39. Magnitude of Maximum Torque of Three Phase Induction Motor
- a) Increases with increase in Rotor Resistance
 - b) Decreases with increase in Rotor Resistance
 - c) Is independent of Rotor Resistance
 - d) Decreases with increase in Applied Voltage
40. For High head and low discharge, which type of hydro turbine is most commonly used?
- a) Pelton
 - b) Francis
 - c) Kaplan
 - d) Cross flow
41. Main criteria for the selection of hydro turbine in any case is
- a) Rotational speed
 - b) Specific speed
 - c) Capacity of the project
 - d) Head
42. Which part of the Francis type hydro turbine is more prone to sand erosion and cavitation?
- a) Spiral casing
 - b) Runner Blades
 - c) Draft Tube
 - d) Guide bearing
43. What happens when CT is Open circuited?
- a) Secondary winding voltage becomes dangerously high
 - b) Secondary winding voltage becomes zero
 - c) Secondary winding voltage remains unchanged
 - d) Primary winding current decreases to zero
44. What is the primary function of Circuit Breaker in Medium and High Voltage System?
- a) To regulate voltage in a circuit
 - b) To detect the fault
 - c) To store the energy in the circuit
 - d) To interrupt the current in a circuit
45. Overhead Earth wire is used in Transmission line to
- a) Increase Transmission Capacity
 - b) Protect the Transmission Lines from Lightning Strike
 - c) Improve the stability of Tower
 - d) Regulate Voltage of Transmission System
46. The Full form of "GIS" is

- a) Global information system
 - b) Geographical information system
 - c) Global insulated system
 - d) Geographically independent system
47. DBMS (Database Management System) is a
- a) Collection of queries
 - b) High-level language
 - c) Programming language
 - d) a platform that stores, modifies and retrieves data.
48. What is the full form of GTS?
[Option]
- a) Great Theodolite System
 - b) Great Trigonometrical Survey
 - c) Great Traverse Survey
 - d) Great Trigonometrical System
49. Roads with ADT of 5000 to 20000 PCU in 20 years perspective periods are called as
- a) Class I roads
 - b) Class II roads
 - c) Class III roads
 - d) Class IV roads
50. As per Nepal Road Standards (NRS 2070), the cross slope of a Water Bound Macadam (WBM) road should be considered as
- a) 5.0%
 - b) 2.5%
 - c) 4.0%
 - d) 1.5 to 2.0%
51. The viscosity of a bitumen sample is expressed in
- a) psi
 - b) dynes
 - c) mm²/sec
 - d) sec
52. The definite peak value of speed across the section from the frequency distribution curve provides
- a) modal speed
 - b) mean speed
 - c) speed for regulation
 - d) spot speed

53. Standard axel load of a vehicle in Nepal is considered as
- a) 102 KN
 - b) 101.7 KN
 - c) 81.6 KN
 - d) 82 KN
54. When out at night, what should you wear to be seen easily by traffic?
- a) Dark colored clothes
 - b) Bright florescent clothes
 - c) Pale colored clothes
 - d) Trendy clothes
55. Standard dimensions (mm x mm) of A3 drawing sheet is
- a) 11.69×16.54
 - b) 29.7×42
 - c) 297×420
 - d) 420×280
56. Which of the following methods of charging depreciation of an asset has increased amount of depreciation as the age of asset increases
- a) sum-of-year digit
 - b) sinking fund
 - c) diminishing balance
 - d) straight line
57. The process of optimizing the project's limited resources without extending the project duration is known as
- a) project crashing
 - b) resource levelling
 - c) resource smoothing
 - d) networking
58. The process of composing/raising the required fund from different sources such as equity, preferred stock, bond and debenture is known as
- a) capital structure planning
 - b) project financing
 - c) capital budgeting decision
 - d) deducing earning per share
59. In which of the following society, people used to seek their existence on growing plants for their cattle and domestic animals

- a) pastoral society
 - b) tribal society
 - c) horticultural society
 - d) agricultural society
60. According to Nepal Engineering Council Act, 2055 (Revised, 2079), all engineering academic institutions shall be in the Council.
- a) affiliated
 - b) united
 - c) recognized
 - d) associated

Section-B (20*2 = 40)

61. The reduced bearing (RB) of a whole circle bearing (WCB) 160° is
- a) 30° N
 - b) 20° SE
 - c) 20° SW
 - d) 45° NW
62. Two right angles (constructed by 3-4-5 rule) forming a single triangle (in first quadrant of reference frame) would have its center of gravity (CG)
- a) 3,3
 - b) 2,4/3
 - c) 3,4/3
 - d) 2, 3
63. A pycnometer containing 400gm sand and water full to the top is 2150gm. If the clear water plus pycnometer weight is 1950gm and specific gravity of soil sample is 2.5, the water content of the sample is
- a) 15%
 - b) 20%
 - c) 25%
 - d) 10%
64. If a coarse-grained soil has $e = 0.75$, $s = 2.75$, the critical gradient at which quick sand condition occurs, is
- a) 0.25
 - b) 1.00

- c) 0.50
d) 0.75
65. The pressure of water in a pipe when water is not flowing is 3×10^5 Pa and when the water flows the pressure falls to 2.5×10^5 Pa. The velocity of flow in m/sec is
a) 1
b) 10
c) 5
d) 20
66. If the depth of a trapezoidal section is 2m, base width is 3m, side slope is 1H:2V, and bed slope is 1 in 1000, Manning coefficient 'n' of the section will be -----
a) 0.012
b) 0.013
c) 0.014
d) 0.015
67. The plastic moment capacity of a simply supported beam (SSB) having 'L' span subjected to a point load at mid span is -----
a) $WL/2$
b) $WL/4$
c) $WL/8$
d) $WL/16$
68. A 50 m span three hinged parabolic arch having 4m central rise, if subjected to 20kN/m uniformly distributed load (UDL) over half of the span, H-moment produced at a distance of 10 m is -----
a) 2000
b) 3000
c) 4000
d) 5000
69. As per Indian Standard (IS) 456: 2000, the minimum area of tension reinforcement in a beam when Fe 415 steel is used,
a) 0.02%
b) 0.20%
c) 0.085%
d) 0.85%
70. In order to account the shear deformation effects, the effective slenderness ratio of laced columns shall be taken as time(s) the actual maximum slenderness ratio

- a) 0.50
 - b) 1.05
 - c) 1.00
 - d) 1.10
71. A ROR type hydropower plant with 100MW installed capacity and with Q40% design flow can generate the full capacity at least for..... days of a year.
- a) 145 days
 - b) 245 days
 - c) 300 days
 - d) 365 days
72. A hydro-turbine with net head 90m and discharge $10 \text{ m}^3/\text{s}$ will have the power output of
- a) 6 MW
 - b) 8 MW
 - c) 10 MW
 - d) 11 MW
73. In order to produce 50 HZ Power Supply, A 4 Pole Alternator must turn at
- a) 1500 RPM
 - b) 3000 RPM
 - c) 6000 RPM
 - d) 12000 RPM
74. 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor e.m.f. will be
- a) 200 Hz
 - b) 50 Hz
 - c) 2 Hz
 - d) 0.2 Hz
75. An electric machine makes use of 300 J of energy to do work in 10s. How much power does it use?
- a) 0.3 W
 - b) 30 W
 - c) 3 W
 - d) 3000 W
76. An earth fault Relay has a pickup setting of 120%. It is connected to a CT of 200/5 A. The current in the primary for which Relay picks up is
- a) 300 A
 - b) 120 A
 - c) 240 A
 - d) 6 A
77. The design speed of a highways is 60 kmph. If radius of curve is 150m and coefficient of friction is 0.15, what should be the super elevation?

- a) 0.01
- b) 2.50
- c) 0.038
- d) 0.07

78. Assuming the coefficient of friction of 0.36 and the total reaction time of driver as 2.5 sec, the stopping sight distance for a design speed of 65 kmph will be.....

- a) 55.25 m
- b) 46.21 m
- c) 4.62 m
- d) 91.4 m

79. Effective monthly interest rate will be, if nominal interest rate of 10% accounted for continuous compounding

- a) 1%
- b) 0.84%
- c) 1.2%
- d) 2%

80. By considering following activities of a project, the project duration will be

Activity	A	B	C	D	E
Immediate predecessors	-	-	-	C	A, B, D
Duration (days)	4	5	3	7	5

- a) 9 days
- b) 10 days
- c) 15 days
- d) 24 days