Nepal Engineering Council Registration Examination
Model Question for <u>Agricultural Engineering (AAgE)</u>

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. Which of the following type of irrigation method uses artificial rain-like system to irrigate the land?

    a) sprinkler irrigation method

    b) furrow irrigation method

c) drip irrigation method

d) border irrigation method

20. If Q and f are the discharge and silt factors, respectively, which of the following is the correct formula for the velocity?

a) $(\frac{Q}{140\,f^2})^{1/6}$

b) $(\frac{Qf^2}{140})^{1/6}$

c) $(\frac{Qf^2}{140})^{1/5}$

d) $(\frac{Qf^2}{160})^{1/6}$

21. Subsurface drain removes …………….. water.
a) Gravitational Water
b) Hygroscopic Water
c) Capillary water
d) Capillary and hygroscopic water

22. Which of the following canal alignment encounters maximum number of cross-drainage works?

a) contour canal

b) side slope canal

c) detour canal

d) ridge canal

23. Ring irrigation approach is categorized under …………. irrigation method.
a) Contour
b) Border
c) Furrow
d) Check Basin

24. As per the mechanical principle of operation, reciprocating pumps are categorized under which of the following types?
a) turbine pumps
b) displacement Pumps
c) centrifugal Pumps
d) propeller Pumps

25. Power available from bullocks is related to its body weight is ……...
a) About 10% of body weight
b) About 20% of body weight
c) About 30% of body weight
d) About 50% of body weight

26. The approximate proportion of the air-fuel in a diesel engine is …………
a) 10:1

b) 20:1

c) 15:1

d) 5:1

27. What is the disc Angle of a disc plow generally?

a) 10∘

b) 20∘

c) 30∘

d) 45∘

28. The broken grain received from main outlet of thresher is due to ……

a) Less concave clearance

b) Low speed of drum

c) More concave clearance

d) Small size of drum

29. The most commonly used pump in tractor hydraulic system is ………….

a) Centrifugal pump

b) Reciprocating pump

c) Gear pump

d) Jet pump

30. Which of the following is the correct formula of shear stress encountered in the shaft for torsion?

a) $\tau = k_s 16 \frac{T}{\pi d^3}$

b) $\tau = k_s 8 \frac{M}{\pi d^3}$

c) $\tau = k_f 32 \frac{M}{\pi d^3}$

d) $\tau = k_s 32 \frac{F}{\pi d^3}$

31. What is the recommended maximum limit for deflection in reinforced concrete slabs?

a) L/180

b) L/240

c) L/360

d) L/480

32. What is the recommended minimum thickness of a two-way slab?

a) 100 mm

b) 125 mm

c) 150 mm

d) 175 mm

33. What is the function of a farm residence?

a) To provide shelter for farm animals

b) To provide a place for farm workers to live

c) To serve as a storage area for farm equipment

d) To provide living quarters for the farmer and their family

34. The purpose of a farm fence is ……….
    a) to provide shade for crops
    b) to prevent soil erosion
    c) to control pests and diseases
    d) to keep animals in or out of a certain area

35. Which of the following members can resist axial compression?

    a) strut
    b) tie
    c) beam
    d) cable

36. 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

37. The most popular method of potato planting is ……..
    a) Dibbling
    b) Broadcasting
    c) Throwing
    d) Ridge & furrow method

38. Which of the following is the unit of soil's electrical conductivity?
    a) dS/m
    b) poise/m
    c) ohm/m
    d) ds/m^2

39. Which method is used for the estimation of Phosphorus in soil?
    a) Olsen
    b) Jackson
    c) Bray
    d) Walkley and Black

40. The average annual soil loss does not depend on ………
    a) Rainfall Erosivity
    b) Soil Erodibility
    c) Crop Management
    d) Soil's Moisture Content

41. Where check dams are constructed?
    a) drainage lines and Gullies

b) canal
c) river
d) ponds and Lakes

42. Which of the following is not a measure for Soil Conservation?
    a) strip cropping
    b) terrace Cultivation
    c) shelter belts
    d) overdrawing of ground Water

43. In a vapor compression system, the highest temperature during the cycle occurs after …..
    a) compression
    b) evaporation
    c) condensation
    d) expansion

44. Which of the following is not an example of an engineering property of bio-materials?
    a) moisture content
    b) density
    c) sugar content
    d) rheological properties

45. Which of the following is a common post-harvest treatment used for grains?
    a) blanching
    b) fermentation
    c) freezing
    d) drying

46. Which of the following is the common expelling process used for oil seed?
    a) abrasive expelling
    b) roller expelling
    c) screw pressing
    d) gravity separation

47. The process of reducing the milk flat globules size of allow them to stay evenly distributed in milk is called as …………..
    a) standardization
    b) pasteurization
    c) homogenization
    d) fortification

48. Which of the following is the main purpose of sterilization?
    a) Killing of Bacteria
    b) Maintaining of Nutrient Value
    c) Destroying pathogenic organism
    d) Retain Good flavor

49. What is the ideal temperature range for the operation of a biogas plant where maximum biogas can be produced?
a) 0-10°C
b) 10-20°C
c) 35-50°C
d) 30-35°C

50. What is a by-product of gasification?
a) water
b) ash
c) carbon dioxide
d) oxygen

51. Which of the following is not a factor of Road's Horizontal alignment Design?
a) design speed
b) horizontal curve
c) setback distance
d) road gradient

52. What is the yield of a rapid gravity filter as compared to that of slow sand filter?
[Options]
a) 10 times
b) 15 times
c) 20 times
d) 30 times

53. Which of the following is a key element of sustainable rural development in Nepal?
a) encouraging migration to urban areas
b) increasing dependence on external aid
c) strengthening local institutions and governance
d) promoting large-scale commercial agriculture

54. Which of the following protocol is related to addressing the issue of global warming by reducing greenhouse gas (GHG) emissions?
a) Kyoto Protocol
b) Montreal Protocol
c) UNFCCC Protocol
d) IPCC Protocol

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) 160^0 is

   a) 30^0N

   b) 20^0SE

c) 20^0SW

d) 45^0NW

62. Two right angles (constructed by 3-4-5 rule) forming a single triangle (in first quadrant of refence 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. If the water holding capacity of the soil is 15% and average moisture content in the root zone prior to applying water is 7%. How long should the irrigation stream of 30 l/sec be

applied in the basin with size of 10m× 12m having crop with root zone depth as 1m and apparent specific gravity of the soil is 1.50?
a) 10 minutes
b) 12 minutes
c) 8 minutes
d) 5 minutes

68. Calculate the Carrying Capacity of the concrete channel having hydraulic radius of 6.22 cm, channel slope of 0.25% and manning coefficient of 0.016.
a) 16.2 l/sec
b) 50.2 l/sec
c) 10.3 l/sec
d) 25.1 l/sec

69. A 4 bottom 40 cm mould board plough is operating at 5 km/h speed with 50 % field efficiency. What is the rate of doing work in hectares per hour?
a) 0.4 ha/h
b) 0.3 ha/h
c) 0.2 ha/h
d) 0.5 Ha/ h

70. Calculate the seed rate of a 7 x 17 cm seed drill whose main drive wheel diameter is 124 cm and total weight of grain collected in 20 revolutions is 0.423 kg.
a) 70.6 kg/ha
b) 45.6 Kg/ha
c) 60.6 Kg/Ha
d) 55.6 Kg/Ha

71. What is the bending moment equation for a simply supported beam with a uniformly distributed load over the entire span?
a) $M = wl^2/8$
b) $M = wl^2/2$
c) $M = wl/2$
d) $M = wl/8$

72. A cow barn is designed to have a concrete floor with a thickness of 15 cm, and a compressive strength of 25 MPa. The live load on the floor is 10 kN/m². What is the required width of the footing for a column load of 500 kN, considering a safe bearing capacity of 25 kN/m²?
a) 1.0 m
b) 1.5 m
c) 2.0 m
d) 2.5 m

73. Which of following EC and pH termed as saline or alkaline soil?
a) EC > 4 dSm^{-1}& pH <4
b) EC > 4 dSm^{-1}& pH < 7

c) EC < 4 dSm^{-1} & pH > 8

d) EC > 4 dSm^{-1} & pH > 8

74. Which of the following is the correct formula of Cropping intensity?

a) $\dfrac{Total\ Cropped\ Area\ in\ a\ year}{Net\ Cultivated\ Area} \times 100$

b) $\dfrac{Total\ Cropped\ Area\ in\ a\ year}{Total\ Bare\ Area} \times 100$

c) $\dfrac{Net\ Cultivated\ Area}{Total\ Bare\ Area} \times 100$

d) $\dfrac{Net\ Cultivated\ Area}{Total\ Cropped\ Area\ in\ a\ year} \times 100$

75. If the moisture Content of the maize having the weight of 2 kg is 25% (in weight basis). What is the moisture content of the paddy in Dry basis?

a) 43%

b) 23 %

c) 13%

d) 33%

76. What is the formula for calculating sensible cooling load? If, Vs is Space volume, ρ_a is Air Density, S is specific Heat Capacity of air, ΔT is Temperature Difference, and U is Overall Heat Transfer Coefficient.

a) $\dfrac{Vs \times S \times \rho_a \times \Delta T}{t}$

b) $\dfrac{Vs \times \rho_a \times \Delta T}{t}$

c) $\dfrac{Vs \times S \times \Delta T}{t}$

d) $\dfrac{Vs \times S \times U \times \Delta T}{t}$

77. What is the formula for calculating the super elevation on a curve (f = 0.15) according to IRC?

a) e = v²/127R

b) e = v²/127G

c) e = v²/127S

d) e = v²/127H

78. How many times the power of wind turbine increases if the wind velocity is increased by 3 times?

a) 6

b) 9

c) 27

d) 81

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