Nepal Engineering Council Registration Examination
Model Question for <u>Electrical Engineering (AEiE)</u>

Section A (60*1 = 60)

1. Two equal resistances are connected in series across a certain supply. If the resistances are connected in parallel, the power produced will be
    a) Two times
    b) Four times
    c) One-half
    d) Equal

2. For transfer of maximum power, the relation between load resistance R_L and internal resistance R_i of the voltage source is
    a) $R_L=2R_i$
    b) $R_L= 0.5R_i$
    c) $R_L=1.5 R_i$
    d) $R_L= R_i$

3. The breakdown voltage of an insulation depends upon………. value of alternating voltage
    a) Average
    b) R.M.S
    c) Peak
    d) Twice the R.M.S

4. At series resonance, the voltage across L or C is
    a) Equal to applied voltage
    b) Less than applied voltage
    c) Much more than applied voltage
    d) Equal to voltage across R

5. When the total charge in the capacitor is doubled, the energy stored
    a) Remain the same
    b) Is doubled
    c) Is halved
    d) Is quadrupled

6. In a balanced star connected system, line voltage are ……..ahead of their respective phase voltages.
    a) 30^0
    b) 60^0
    c) 120^0
    d) 180^0

7. Magneto restriction is a phenomenon whereby the magnetism of ferromagnetic material leads to a change in
    a) Relative permeability
    b) Physical dimension

c) Spontaneous magnetism
d) Magnetic susceptibility

8. The no load pf of a transformer is small because
    a) Iron loss component of I_0 is large
    b) Magnetizing component of I_0 is large
    c) Magnetizing component of I_0 is small
    d) Iron loss component of I_0 is small

9. The main function of interpoles is to minimize ……… between the brushes and the commutator when the dc machine is loaded
    a) Friction
    b) Sparking
    c) Current
    d) Wear and tear

10. At lagging loads, armature reaction in an alternator is
    a) Cross- magnetizing
    b) Demagnetizing
    c) Non effective
    d) Magnetizing

11. If starting winding of a single-phase induction motor is left in the circuit, it will …
    a) Draw excessive current and overheat
    b) Run slower
    c) Run faster
    d) Spark at light loads

12. The efficiency of three phase induction motor is approximately proportional to ….
    a) 1-S
    b) S
    c) N
    d) Ns

13. Which of the following statements accurately describes the working principles of water turbines?
    a) Water turbines utilize the kinetic energy of water to generate mechanical power.
    b) Water turbines harness the potential energy of water to produce electricity.
    c) Water turbines convert the chemical energy of water into rotational motion.
    d) Water turbines rely on the thermal energy of water to generate hydraulic power.

14. What is a key advantage of diesel power plants in certain applications?
    a) Ability to generate electricity from renewable energy sources
    b) High efficiency and low fuel consumption
    c) Can provide electricity during Peak hour
    d) Minimal environmental impact and emissions

15. Photovoltaic cell or solar cell converts........
    a) Thermal energy into electricity
    b) Electromagnetic radiation directly into electricity

c) Solar radiation into thermal energy

d) Solar radiation into kinetic energy

16. Which of the following primary cells has the lowest voltage?
    a) Lithium
    b) Zinc chloride
    c) Mercury
    d) Carbon zinc

17. The measures to improve the transient stability of the power system during the unbalanced or unsymmetrical fault can be taken as …………
    a) Single pole switching of circuit breaker (CB)
    b) Excitation control
    c) Phase shifting transformer
    d) Increasing turbine valve opening

18. The main exciter used in DC excitation is ….
    a) Field on stator
    b) Armature on stator
    c) Field on rotor
    d) Field on poles

19. The static error of an instrument implies the
    a) Difference between the measured value and the true value of the quantity
    b) Accuracy of the instrument
    c) Error introduced in low varying inputs
    d) Irreparability of the instrument

20. In a low power factor wattmeter, the compensating coil is connected
    a) in series with the current coil
    b) in parallel with the current coil
    c) in series with pressure coil
    d) in parallel with pressure coil

21. The capacitive transducers are normally used for
    a) Both static and dynamic measurements
    b) Transient measurements
    c) Static measurements
    d) Dynamic measurements

22. In dual slope type of Analog to digital converter, an input hold time is
    a) Almost zero
    b) Higher than that of flash type Analog to digital converters
    c) Longest
    d) Almost one

23. Which of the following is a special purpose register of microprocessor
    a) Program counter

b) Instruction register
c) Accumulator
d) Temporary register

24. If a power transformer has a star-connected primary and a delta-connected secondary, then the Current Transformer (CT) connections on its primary and secondary sides should be …….
a) Delta and Star respectively
b) Star and Delta respectively
c) Delta and Delta respectively
d) Star and Star respectively

25. In a closed loop control system, with positive value of feedback gain, the overall gain of the system will
a) Decrease
b) Increase
c) Be unaffected
d) Equal

26. Roots on the imaginary axis makes the system
a) Stable
b) Unstable
c) Marginally stable
d) Linear

27. Which plots in frequency domain represents the two separate plots of magnitude and phase against frequency in logarithmic value
a) Polar plots
b) Bode plots
c) Nyquist plots
d) Linear Plots

28. In a thyristor, anode current is made up of
a) Electrons only
b) Electrons or holes
c) Electrons and holes
d) Holes only

29. The load voltage of a chopper can be controlled by varying the
a) Duty cycle
b) Firing angle
c) Reactor position
d) Extinction angle

30. HVDC transmission has …………….. as compared to HVAC transmission a) Low cost of HVDC transmission
a) Smaller transformer size

b) Smaller conductor size
c) Higher corona loss
d) Smaller power transfer capabilities

31. A fuse performs:
    a) Detection function only
    b) Circuit interruption function only
    c) Both detection and interruption functions
    d) Circuit connection function only

32. The arc voltage in circuit breaker is
    a) In phase with arc current
    b) Lagging arc current by 90^0
    c) Leading arc current by 90^0
    d) Lagging arc current by 180^0

33. In static overcurrent relay, inverse time characteristics are obtained by
    a) A transistor amplifier
    b) An integrating circuit
    c) A transistor switch
    d) A differentiating circuit

34. Surge absorber is used for protection against
    a) High voltage low frequency oscillation
    b) High voltage high frequency oscillation
    c) Low voltage high frequency oscillation
    d) Low voltage low frequency oscillation

35. Resistance earthing is employed for voltage between
    a) 3.3kV and 11kV
    b) 11kV and 33kV
    c) 33kV and 66kV
    d) 66kV and 132kV

36. Shunt compensation in the high voltage line is used to improve …..
    a) Stability and fault level
    b) Fault level and voltage profile
    c) Voltage profile and stability
    d) Stability, fault level and voltage profile

37. The main drawback of overhead system over underground system is
    a) Underground system is more flexible than overhead system
    b) Higher charging current
    c) Surge problem
    d) High initial cost

38. Which gas has the highest breakdown strength at atmospheric pressure?
    a) Air
    b) Nitrogen

c) SF6
d) Oxygen

39. If the length of the cross arm is increased, the string efficiency
    a) Becomes zero
    b) Increases
    c) Remains unaffected
    d) Decreases

40. Practical loads are usually
    a) Resistive
    b) Capacitive
    c) Inductive
    d) Resistive + Inductive

41. The feeder is designed mainly from the point of view of
    a) Its current carrying capacity
    b) Voltage drop in it
    c) Operating voltage
    d) Operating frequency

42. Synchronous condenser used for the power factor improvement is synchronous motor
    which operates at
    a) No load with leading current
    b) Full load with lagging current
    c) No load with lagging current
    d) Full load with leading current

43. The gas used in gas filled filament lamp is
    a) Helium
    b) Oxygen
    c) Nitrogen
    d) Ozone

44. Active power and apparent power are represented by …………….
    a) kW and kVAR
    b) kVAR and kVA
    c) kVA and kVAR
    d) kW and kVA

45. The typical active load is
    a) Hoist
    b) Blower
    c) Pump
    d) lathe

46. For heating plywood, the frequency should be
    a) (1-2) MHZ

b) (10-25) KHZ
c) 1KHZ
d) 100HZ

47. In Kando System of track electrification
    a) Single phase AC is converted to DC
    b) Single phase AC is converted to 3 Phase AC
    c) 3 phase AC is converted into DC
    d) 3 phase AC is converted into Single Phase AC

48. Two Part tariff is charged on the basis of
    a) Connected load
    b) Unit consumed
    c) Maximum demand
    d) Connected load and Unit consumed

49. The chances of occurrence of corona are maximum during
    a) Humid weather
    b) Dry weather
    c) Winter
    d) Hot summer

50. For a transmission line which among the following relation is true?
    a) $-AB + CD = 1$
    b) $AD + BC = 1$
    c) $AB - CD = -1$
    d) $-AD + BC = 1$

51. If all the sequence voltages at the fault point in a power system are equal, then the fault is a
    a) Three phase fault
    b) Line to ground fault
    c) Line to line fault
    d) Double line to ground fault

52. In load flow studies of a power system, a voltage control bus is specified by
    a) Real power and reactive power
    b) Reactive power and voltage magnitude
    c) Voltage and voltage phase angle
    d) Real power and voltage magnitude

53. Which stability information is obtained from the equal area criterion?
    a) Absolute stability
    b) Transient stability
    c) Steady state stability
    d) Transient stability and Steady state stability

54. VAR compensators are used to …………..
    a) Increase the active power
    b) Increase the reactive power
    c) Decrease the active power
    d) Decrease the reactive power

55. Standard dimensions (mm x mm) of A3 drawing sheet in mm 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 (with revised, 2080), all engineering academic institutions shall be .... in the Council.
    a) affiliated
    b) united
    c) recognized
    d) associated

Section-B (20*2 = 40)

61. Two identical cells whether joined in series or in parallel are supplied with the same current when connected to an external resistance of 1Ω. The internal resistance of each cell will be ……
a) 2Ω
b) 4Ω
c) 8Ω
d) 1Ω

62. The power of a 3 phase, 3- wire balanced system was measured by two wattmeter method. The reading of one of the wattmeter's was found to be double than that of the other. What is the power factor of the system?
a) 1.00
b) 0.71
c) 0.87
d) 0.50

63. The hysteresis and eddy current losses of single-phase transformer on 200V, 50HZ supply are P_h and P_e, respectively. The percentage decrease in these losses when operated on 160V, 40HZ supply would respectively be ……….
a) 32% and 36%
b) 25% and 50%
c) 20% and 36%
d) 40% and 80%

64. When load on a synchronous motor running with normal excitation is increased, armature current drawn by it increases because ……………
a) Back emf becomes less than applied voltage
b) Power factor is decreased
c) Net resultant voltage (ER) in armature is increased
d) Motor speed is reduced

65. Which winding in compound excitation is responsible for change air gap flux per pole?
a) Series
b) Parallel
c) Interconnected
d) No coil is responsible

66. If the DC excitation is suddenly dropped to zero, the three-phase alternator ……..
a) Stops to zero speed in few seconds
b) Runs a motor
c) No change in the operating condition
d) Continues to run as motor but at lower speed

67. In a 3-phase power measurement by two wattmeter method, the reading of one of the wattmeter was zero. The power factor of the load must be ……..
a) 1.0
b) 0.5

c) 0.3

d) 0.0

68. For a full-scale voltage (0-5V), the resolution of 6 bit analog to digital converter (ADC) is near to ……….
    a) 78mV
    b) 833mV
    c) 156mV
    d) 20mV

69. A step-up chopper is fed with 200V. The conduction time of the thyristor is 200µs and the required output is 600V. If the frequency of operation is kept constant and the pulse width is halved, the new output voltage will be …..
    a) 600 V
    b) 300 V
    c) 400 V
    d) 200 V

70. Snubber circuits are used with thyristors to ………..
    a) See the SCR turns ON at a voltage much less than its forward break over voltage
    b) To protect the gate circuit
    c) To limit the rate of rise of voltage dv/dt
    d) To limit the rate of rise of current di/dt

71. The neutral of 10MVA alternator is earthed through a resistance of 5Ω. The earth fault relay is set to operate at 0.75A. The current transferors have a ratio of 1000/5. What percentage of alternator winding is protected?
    a) 85%
    b) 88.2%
    c) 15%
    d) 11.8%

72. A transformer is rated at 11 kV/.4 kV, 500 KVA, 5 % reactance. What is the short circuit MVA of the transformer when connected to an infinite bus ?
    a) 20 MVA
    b) 10 MVA
    c) 5 MVA
    d) 15 MVA

73. The surge impedance of a 300 km long overhead line is 180 Ω. For a 150 km length of the same line, the surge impedance in ohms would be …..
    a) 270 Ω
    b) 180 Ω
    c) 360 Ω
    d) 90 Ω

74. Two synchronous generators G1 and G2 rated 200 MW and 400 MW, respectively, are operated in parallel to supply a total load of 300 MW. If the governors in both machines are set to drop by 4%, what would be the individual power supplied by each generator?
    a) G1 = 50 MW, G2 = 250 MW
    b) G1 = 200 MW, G2 = 100 MW
    c) G1 = 150 MW, G2 = 150 MW
    d) G1 = 100 MW, G2 = 200 MW

75. A 230V, 10A,1500 rpm DC separately excited motor of 0.2 ohm excited from external DC source of 50 V. Calculate the torque developed by the motor on full load.
    a) 13.89 N-m
    b) 14.52 N-m
    c) 13.37 N-m
    d) 14.42 N-m

76. The candle power of a lamp placed normal to a working plane is 60 CP. Calculate the distance if the illumination is 15 lux.
    a) 1.5 m
    b) 2.0 m
    c) 3.5 m
    d) 2.5 m
       Ans: b

77. The percentage reactance of a 100 kVA, 5 kV, 5 ohm reactance will be ……….
    a) 2%
    b) 0.2%
    c) 20%
    d) 4%

78. An 800 KV transmission line has a maximum power transfer capacity of 100 MW. If it is operated at 400 KV with the series reactance unchanged, then maximum power transfer capacity is approximately ……
    a)100 MW
    b)200 MW
    c)25 MW
    d)50 MW

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