Nepal Engineering Council Registration Examination

Model Question for Electrical and Electronics Engineering (AEEE)

Section A (100*1 = 100)

1. Decibel relation for power gain is:

a) $N_{dB} = 20\ log_{10}\left(\frac{V_2^2}{V_1^2}\right) + 20\ log_{10}\left(\frac{Z_1}{Z_2}\right)$

b) $N_{dB} = 10\ log_{10}\left(\frac{V_2^2}{V_1^2}\right) + 10\ log_{10}\left(\frac{Z_2}{Z_1}\right)$

c) $N_{dB} = 20\ log_{10}\left(\frac{V_2}{V_1}\right) + 10\ log_{10}\left(\frac{Z_2}{Z_1}\right)$

d) $N_{dB} = 10\ log_{10}\left(\frac{V_2}{V_1}\right) + 10\ log_{10}\left(\frac{Z_2}{Z_1}\right)$

2. Maximum power that can be transfer from source to load is:
   a) 25%
   b) 75%
   c) 50%
   d) 100%

3. Power factor $\frac{R}{Z}$ has maximum value of:
   a) 0.0
   b) 0.5
   c) 1.0
   d) 1.5

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. The minimum phase transfer function is the one having …….
   a) Poles and zeros in right hand side
   b) Poles and zeros in left hand side
   c) Poles in left hand side and zeros in right hand side
   d) Poles in right hand side and zeros in left hand side

6. If the polynomial P(s) and its derivative gives a continued fraction expansion with …..... coefficients, then the polynomial P(s) is Hurwitz.
   a) All negative
   b) All positive
   c) Positive or negative
   d) Positive and negative

7. Which of the following device has negative resistance?
   a) Gas diode
   b) Vacuum diode
   c) Tunnel diode
   d) None of the above

8. A MOSFET uses the electric field of a..... to control the channel current.
   a) Capacitor
   b) Battery
   c) Generator
   d) None of the above

9. An oscillator produces oscillations due to ……..
   a) Positive feedback
   b) Negative feedback
   c) Partly positive and partly negative feedback
   d) Neither positive nor negative feedback

10. The noise factor of an ideal amplifier is .....dB.
    a) 0
    b) 0.5
    c) 5
    d) 10

11. Logarithmic amplifiers are used in …….
    a) Adders
    b) Dividers
    c) Multipliers
    d) All of the above

12. In standard TTL, the 'totem pole' refers to …..
    a) Multi-emitter input stage
    b) The phase splitter
    c) Open collector output stage
    d) The output buffer

13. Two's compliment of 00011011 is:
    a) 11100100
    b) 11100101
    c) 11000101
    d) 11110001

14. Elementary building block of combinational circuit is:
    a) Logic gate
    b) Flip-flop
    c) Both logic gate and flip-flop
    d) Memory

15. Synchronous circuit that changes its state at specific clock signal is:
    a) Event driven
b) Clock driven
    b) Pulse driven
    c) Frequency driven

16. Bandwidth of microprocessor represents:
    a) Clock speed
    b) Width of internal bus
    c) Number of bit processed/instruction
    d) Number of bit processed/sec

17. PPI 8255 has internal bus of size:
    a) 4 bit
    b) 8 bit
    c) 16 bit
    d) 32 bit

18. RISC is characterized by ……

a) Hardwired control design with no micro codes
b) Fixed instruction format
c) Executing most of the instructions in a single clock cycle
d) All of the above

19. Which among of the following doesn't come under object-oriented programming concept?
a) Data hiding
b) Message passing
c) Platform independent
d) Data binding

20. If statement condition is always written in .....Parenthesis.
a) Square []
b) Curly {}
c) Angle <>
d) Small ()

21. Recursive function is similar to ……. .
a) Switch case
b) Loop
c) If-else
d) Do loop

22. In general, the index of the first element in an array is …….. .
a) 0
b) -1
c) 2
d) 1

23. Programmers use ..... when they need to pass a group of related variables.
a) Structure variable
b) Variable
c) Auto variable
d) Constant variable

24. If same message is passed to objects of several different classes and all of those can respond in a different way, this feature is called ……. .
a) Inheritance
b) Overloading
c) Polymorphism
d) Over-riding

25. 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

26. Sensitivity of a sensor can be depicted by …… .
    a) Nyquist plot
    b) Pole – zero plot
    c) Bode plot
    d) Box plot

27. In a circuit, an ammeter is always connected in …… .
    a) Series
    b) Parallel
    c) Both parallel and series
    d) None of the above

28. Which of the following is not a characteristic of an open loop system?
    a) It is inaccurate.
    b) It is economical.
    c) It has small bandwidth.
    d) It has feedback elements.

29. First order system is defined by …….
    a) Number of poles at origin
    b) Order of differential equation
    c) Total number of poles of the equation
    d) Total number of poles and order of the equation

30. Root locus always starts from ……
    a) The open loop poles and terminates at the open loop zeros.
    b) The open loop zeros and terminates at the open loop poles.
    c) The close loop poles and terminates at the open loop zeros.
    d) The close loop poles and terminates at the close loop zeros.

31. In an ideal transformer, the no load primary current I_0
    a) Lags behind V_1 by 90^0
    b) Is in phase with V_1
    c) Leads V_1 by 90^0
    d) Lags V_1 by an angle lying between 0^0 and 90^0

32. The function of brushes in a DC generator is to…….
    a) Hold the armature winding
    b) Provide a low reluctance path for the magnetic flux
    c) Convert AC to DC
    d) Collect current from the commutator

33. The speed of a DC motor can be varied by varying ……
    a) Field current
    b) Applied voltage
    c) Resistance in series with armature
    d) Any of the above

34. An induction motor is ……..
    a) Self starting with zero torque
    b) Self starting with high torque
    c) Self starting with low torque
    d) Non-self starting

35. When the speed of a synchronous generator increases, then ……
    a) The frequency increases
    b) The frequency decreases
    c) The frequency remains constant but the power factor decreases
    d) Power factor and frequency remains constant

36. When any one phase of a 3-phase synchronous motor is short-circuited, the motor ……
    a) Will overheat in the spot
    b) Will fail to pull into step
    c) Will refuse to start
    d) Will not come up to speed

37. In an analog communication, a unit impulse response of a causal system is …… for $t<0$.
    a) 0
    b) 1
    c) Infinite
    d) -1

38. If the gain crossover frequency of a system is less than its phase cross over frequency, then the system is …….
    a) Critically stable
    b) Unstable
    c) Stable
    d) Marginally stable

39. In inverse DTFT, the limits of the integral is defined between $-\pi$ to π because of the property ……
    a) Time invariance
    b) Periodicity
    c) Implication
    d) Convolution

40. One-sided z-transform is also known as …….
    a) Unilateral z-transform
    b) Bilateral z-transform
    c) Trilateral z-transform
    d) None of the above

41. What is the stability of the system $S^3 + S^2 + S + 4 = 0$ using Hurwitz criteria?
    a) Unstable
    b) Stable
    c) Critically stable
    d) Marginally stable

42. The transfer function of FIR filters will have ……
    a) Poles and zeros
    b) Only poles
    c) Only zeros
    d) Only constants

43. Which modulation is used in microwave band?
    a) Amplitude modulation
    b) Pulse modulation
    c) Frequency modulation
    d) Phase modulation

44. Thermal noise is independent of ……
    a) Boltzmann's constant
    b) Temperature
    c) Bandwidth
    d) Centre frequency

45.....is mostly preferred for telegraphy.
    a) Single tone modulation
    b) On-off keying
    c) Frequency shift keying
    d) Pulse code modulation

46. The process of converting the analog sample into discrete form is called …….
    a) Quantization
    b) Sampling
    c) Multiplexing
    d) Modulation

47. Which of the following is not a property of block code?
    a) Linearity
    b) Systematic
    c) Cyclic
    d) Non-linearity

48. The open standard interconnection (OSI) model is a..... layer model for the design of network system.
    a) Two
    b) Five
    c) Seven
    d) Eight

49. Which of the following pollutant causes acid rain?
    a) NO_2
    b) SO_2
    c) CO_2

d) NO

50. What is the purpose of impedance matching in transmission lines?
    a) To reduce signal reflection
    b) To increase signal reflection
    c) To reduce signal attenuation
    d) To increase signal attenuation

51. The primary function of the fuse is to ……
    a) Open the circuit
    b) Protect the appliance
    c) Protect the line
    d) Prevent excessive current flow through the circuit

52. Which type of wiring is suitable for multi-storey buildings?
    a) Tree system
    b) Ring main system
    c) Distribution board system
    d) Ring main and distribution board system

53. Input ripple of SMPS is ……..
    a) High
    b) Low
    c) Nil
    d) Very low

54.....is a series type unbalanced fault that occurs in a power system.
    a) Line to line fault
    b) Double line to ground fault
    c) Single line to ground fault
    d) Open conductor fault

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

61. Two equal resistances of resistors are connected in series across a certain supply. If the resistances are now connected in parallel, the power produced will become:
[Option]
a) one half
b) two times
c) three times
d) four times

62. For ac circuit, the form factor is the ratio of?
[Option]
a) average value / r.m.s. value
b) r.m.s, value / average value
c) r.m.s. value / peak value
d) average value / peak value

63. For the two port network, the condition of symmetry in terms of z-parameters is:
[Option]
a) $Z_{11} = Z_{22}$
b) $Z_{12} = Z_{21}$
c) $Z_{11} = Z_{21}$
d) $Z_{12} = Z_{22}$

64. The transient current in an RLC circuit is oscillatory when:
[Option]
a) R = 0
b) $R > 2\sqrt{L/C}$

c) $R=2\sqrt{L/C}$

d) $R<2\sqrt{L/C}$

65. In an intrinsic semiconductor:
[Option]
a) only electrons carry current
b) only holes carry current
c) both electrons and holes carry current
d) both electrons and holes carry current with holes being the majority carriers

66. JFET is considered as a voltage-controlled device because:
[Option]
a) drain current is controlled by gate voltage
b) gate current is controlled by drain voltage
c) drain current is controlled by source voltage
d) gate current is controlled by source voltage

67. In a properly connected BJT, an increase in base current causes increase in:
[Option]
a) I_C only
b) I_E only
c) Leakage current
d) Both I_C and I_E

68. The common mode rejection ration (CMRR) of an ideal OP-Amp is:
[Option]
a) zero
b) low
c) medium
d) infinite

69. A half-adder can be constructed from
[Option]
a) Two XNOR gates only
b) One XOR and one OR gate with their outputs connected in parallel
c) One XOR and one OR gate with their inputs connected in parallel
d) One XOR gate and one AND gate

70. A J-K flip-flop can be made from an R-S flip-flop by using two additional:
[Option]
a) OR gates
b) AND gates
c) NOR gates
d) NOT gates

71. A microprocessor has eight data lines and sixteen address lines. The microprocessor is of type:
[Option]
a) 8 bit
b) 16 bit
c) 20 bit
d) 32 bit

72. Permanent memory of a computer is known as:
[Option]
a) RAM
b) ROM
c) CD-ROM
d) CPU

73. In a login system, the attempts are allowed up to 3 times. Which type of loop is best suited in this system?
[Option]
a) for
b) while
c) nested for
d) do while

74. Which programming language is called the mother of programming languages?
[Option]
a) C
b) C++
c) Java
d) COBOL

75. What does the format specifier %10d in printf("%10d",num); do?
[Option]
a) prints the number in a field of 10 columns
b) prints the number with leading zeros in a field of 10 columns
c) prints only the number without any extra spaces
d) prints the number left-aligned in a field of 10 columns

76. What is the meaning of the following declaration in C programming language?
int(*p)[5]
[Option]
a) p is a pointer to 5 integers
b) p is a pointer to integer array
c) p is a pointer to an array of 5 integers
d) p is not a pointer

77. A meter reads 125 V and the true value is 125.5 V. What is static error of the instrument?
[Option]
a) 125/0.5 V
b) 125 V
c) 0.5 V
d) 0.5/125 V

78. Thermo couples are:
[Option]
a) passive transducers
b) active transducers
c) reactive transducers
d) impedance transducers

79. Phase margin of a system is used to specify which of the following?
[Option]
a) Frequency response
b) Absolute stability
c) Time response

d) Relative stability

80. Which is the correct formula for the transfer function of positive feedback?
[Option]
a) T = G/(1-GH)
b) T = G/(1+GH)
c) T = H/(1+GH)
d) T = G/(GH)

81. According to the Faraday's first law of electromagnetic induction, the ……. is induced in a coil or conductor.
[Option]
a) emf only
b) current only
c) both current and emf
d) power

82. The main reason for generation of harmonics in a transformer could be:
[Option]
a) saturation of core
b) fluctuating load
c) poor insulation
d) mechanical vibrations

83. When two D.C. series motors are connected in parallel, the resultant speed is:
[Option]
a) more than the normal speed
b) normal speed
c) loss than the normal speed
d) zero

84. In a split phase motor, the running winding should have:
[Option]
a) high resistance and low inductance
b) low resistance and high inductance
c) high resistance as well as high inductance
d) low resistance as well as low inductance

85. Which of the following electrical signals are continuous in values and discrete in time?
[Option]
a) sampled signals
b) quantized signals
c) analog signals
d) digital signals

86. What is the result of the inverse Laplace transform of F(s) = 1/s?
[Option]
a) $e^{(-at)}$
b) sin(at)
c) cos(at)
d) u(t)

87. Z -transform of a^n is….. (where $n \geq 0$)
[Option]
a) a/(z -a)

b) a/(z + a)
c) z/(z -a)
d) z/(z + a)

88. In the frequency response graph of an amplifier the 3 dB point refers to:
[Option]
a) 0.707 power point
b) ¾ power point
c) ¼ power point
d) ½ power point

89. What is the function of microphone? It converts:
[Option]
a) electric signals to sound signals
b) sound signals to electric signals
c) electromagnetic waves to sound signals
d) sound signals to electromagnetic waves

90. FM signals are generally propagated by:
[Option]
a) ground waves
b) direct waves
c) sky waves
d) ground reflected waves

91. If 2 K bits/second is bit rate, what is the minimum PCM bandwidth required for successful transmission?
[Option]
a) 1 KHz
b) 2 KHz
c) 4 KHz
d) 8 KHz

92. What is the full form of “LAN”?
[Option]
a) Line Area Network
b) Linear Area Network
c) Land Area Network
d) Local Area Network

93. The power output from a hydro-electric power plant depends on:
[Option]
a) Head, type of dam and discharge
b) Type of dam, discharge and type of catchment area
c) Head, discharge and efficiency of the system
d) Type of draft tube, type of turbine and efficiency of the system

94. Theoretical power (watt) in a wind system is given by:
[Option]
a) $P = 0.5\ AV^3$
b) $P = 0.5\ \rho\ AV^2$
c) $P = 0.5\ \rho\ AV^3$
d) $P = 0.5\ \rho\ AV^3$

95. Fusing current is the:
[Option]

a) Maximum current at which the fuse element will get heated
b) Rated current of a fuse
c) The minimum current at which the fuse element will get heated
d) The maximum current at which the fuse element will melt

96. Fault level means:
[Option]
a) Voltage at fault point
b) Fault power factor
c) Fault MVA
d) Fault current

97. In house the illumination is in the range of:
[Option]
a) 60-65 lumens/watt
b) 35-45 lumens/watt
c) 10-20 lumens/watt
d) 2-5 lumens/watt

98. What does ‘critical path’ mean in project management?
[Option]
a) The shortest path to complete the project
b) The most expensive tasks of the project
c) The sequence of dependent tasks that determine the project duration
d) The least important tasks in the project

99. Slack time in PERT analysis:
[Option]
a) Can never be greater than zero
b) Is always zero for critical activities
c) Can never be less than zero
d) Is minimum for critical events

100. How many central executive members of Nepal Engineering Association (NEA) are democratically elected?
[Option]
a) 15
b) 21
c) 25
d) 29
a