

Nepal Engineering Council Registration Examination
Model Question for Mechatronics Engineering (AMtE)

(100*1 = 100)

1. A ceiling fan uses _____
[Option]
 - a) split-phase motor
 - b) capacitor start and capacitor run motor
 - c) universal motor
 - d) capacitor start motor

2. The common collector amplifier is also known as _____
[Option]
 - a) collector follower
 - b) Base follower
 - c) Emitter follower
 - d) Source follower

3. Which of these sets of logic gates are known as universal gates?
[Option]
 - a) XOR, NAND, OR
 - b) OR, NOT, XOR
 - c) NOR, NAND, XNOR
 - d) NOR, NAND

4. Kinematic link, chain and inversion, Types of joints, Belts, chain and gear drives
[Option]
 - a) zero
 - b) varies linearly
 - c) varies exponentially
 - d) constant

5. Heat transfer takes place according to which of the following law?
[Option]
 - a) First law of thermodynamics
 - b) Second law of thermodynamics
 - c) Newton's second law of motion
 - d) Newton's law of cooling

6. Which of the following manufacturing process is favourable for making tool for ECM?
[Option]
 - a) Cold forging
 - b) Casting
 - c) Shaping
 - d) Laser cutting

7. Pressure of 1 bar is equal to_____
- [Option]
- a) 14.5 psi
 - b) 145 psi
 - c) 12.5 psi
 - d) 125 psi
8. Which of the following is used as a component in hydraulic power unit?
- [Option]
- a) pressure gauge
 - b) filler gauge
 - c) valve
 - d) reservoir
9. Which component of a hydraulic system is used to store the sufficient amount of hydraulic oil?
- [Option]
- a) Rotatory pumps
 - b) Oil reservoir
 - c) Flow control valve
 - d) Pressure gauge
10. In pneumatic system, an AND gate is known as_____
- [Option]
- a) non-return valve
 - b) gate valve
 - c) check valve
 - d) dual-pressure valve
11. Which of the following logic valve is known as shuttle valve?
- [Option]
- a) OR gate
 - b) AND gate
 - c) NOR gate
 - d) NAND
12. Automation system is also called as _____.
- [Option]
- a) Process automation
 - b) Automatic technique
 - c) Manual process
 - d) Output automation
13. Which of the following is not the feature of a modern control system?
- [Option]
- a) Correct power level
 - b) No oscillation
 - c) Quick response
 - d) Accuracy

14. Most hydraulic circuits:
[Option]
- a) Operate from a central hydraulic power unit
 - b) Use air-over-oil power units
 - c) Have a dedicated power unit
 - d) Does not have dedicated power unit
15. The identical first order system have been cascaded non-interactively. The unit step response of the systems will be:
[Option]
- a) Overdamped
 - b) Underdamped
 - c) Undamped
 - d) Critically damped
16. If gain margin and phase margin both are positive, then the system is said to be:
[Option]
- a) stable
 - b) unstable
 - c) critically stable
 - d) marginally stable
17. When gain K of the open-loop transfer function of order greater than unity is varied from zero to infinity, the closed-loop system
[Option]
- a) may become unstable
 - b) stability may improve
 - c) stability may not be affected
 - d) will become highly stable
18. A temperature control system is known as
[Option]
- a) process control system
 - b) servomechanism
 - c) cascade control system
 - d) procedure control system
19. Sensor provides output signal depending on _____.
[Option]
- a) process
 - b) Input
 - c) reaction
 - d) current
20. How many pins does temperature sensor have?
[Option]
- a) 5 legs
 - b) 4 legs
 - c) 3 legs
 - d) 2 legs

21. Thermocouple generate output voltage according to _____.
[Option]
a) Circuit parameters
b) Humidity
c) Temperature
d) Voltage
22. A sensor that detects inclination or tilt is called _____.
[Option]
a) Position sensor
b) Tilt sensor
c) Angled sensor
d) Turn sensor
23. Radiation sensor detects radiation level from _____ objects.
[Option]
a) Radioactive
b) Electrical
c) Mechanical
d) black
24. One advantage of an electric to pneumatic valve positioner is
[Option]
a) It can be used on flow control
b) It produces positive valve position
c) It conserves energy
d) It dampers valve travels
25. The process of superimposing message signal with the carrier wave is known as:
[Option]
a) demodulation
b) attenuation
c) modulation
d) detection
26. The process selecting a desired frequency out of a complex wave is called
[Option]
a) superposition
b) modulation
c) tuning
d) demodulation
27. On which of the following frequencies does a Wi-Fi network work?
[Option]
a) 2.4 MHz
b) 5 MHz
c) 10 GHz
d) 5 GHz

28. In TV transmission
[Option]
a) AM for picture and FM for sound are employed
b) FM for picture and AM for sound are employed
c) FM is employed for both picture and sound
d) AM is employed for both picture and sound
29. Which of the following is not an example of wireless communication?
[Option]
a) Wi-Fi
b) Mobiles
c) Landline
d) Wireless Computer Parts
30. T Which circuit is called as regenerative repeaters?
[Option]
a) Analog circuits
b) Digital circuits
c) Amplifiers
d) A/D converters
31. What is a digital recorder?
[Option]
a) records digital data
b) records analog data
c) does not record data
d) records both analog and digital data
32. The roots of the equation $H(z)$ must occur in _____
[Option]
a) Identical
b) Zero
c) Reciprocal pairs
d) Conjugate pairs
33. F.M systems as compared to A.M systems
[Option]
a) are equally affected by noise
b) are less affected by noise
c) are more affected by noise
d) are highly affected by noise sense they operate at VHF and UHF
34. Digital instruments have input impedance of the order of ____
[Option]
a) Ω
b) $k\Omega$
c) $M\Omega$
d) $m\Omega$

35. Switching time of LEDs is of the order of _____
[Option]
a) 1 s
b) 1 ms
c) 1 μ s
d) 1 ns
36. The gas used in plasma screens is a mixture of
[Option]
a) nitrogen and oxygen
b) nitrogen and xenon
c) argon and nitrogen
d) argon and xenon
37. Which of the following elements transfers torque and is only subjected with the bending moment?
[Option]
a) Brake
b) Clutch
c) Axle
d) Belt drive
38. What is the function of bearing?
[Option]
a) generate heat
b) ease of motion of shafts and gears
c) balancing shaft
d) rotate at high speed
39. The most suitable bearing for carrying very heavy loads at slow speed is _____
[Option]
a) hydrodynamic bearing
b) ball-bearing
c) roller bearing
d) hydro-static bearing
40. Axial thrust is not there in which of the following gears?
[Option]
a) double helical gear
b) bevel gear
c) spiral gear
d) single helical gear
41. Which of the following methods cannot be used for welding carbon steel?
[Option]
a) Arc welding
b) Gas welding
c) Ultrasonic welding
d) Forge welding

42. For which of the following design factor of safety the design will work properly?

[Option]

- a) 0.1
- b) 0.9
- c) 1
- d) 2

43. What is Microprocessor?

[Option]

- a) A multipurpose PLD that accepts binary data as input
- b) A multipurpose PLD that accepts an integer as input
- c) A multipurpose PLD that accepts whole numbers as input
- d) A multipurpose PLD that accepts prime numbers as input

44. What is the word length of an 8-bit microprocessor?

[Option]

- a) 8 bits – 64 bits
- b) 4 bits – 32 bits
- c) 8 bits – 16 bits
- d) 8 bits – 32 bits

45. What is the word length of the Pentium-II microprocessor?

[Option]

- a) 8-bit
- b) 32-bit
- c) 64-bit
- d) 16-bit

46. CCTV cameras is an example for _____automation.

[Option]

- a) Building automation
- b) Office automation
- c) Scientific automation
- d) Industrial automation

47. _____is an example for light automation?

[Option]

- a) Rocket launching
- b) Street solar lightening
- c) Automated bottle filling stations
- d) Smoke detectors

48. Relays is a _____device.

[Option]

- a) Electrical
- b) Electronic
- c) Mechanical
- d) Electromechanical

49. Which is the first aspect which needs to be considered in the Mechatronics design process?
[Option]
- a) Hardware integration and simulation
 - b) Conceptual design
 - c) Mathematical modeling
 - d) Modeling and simulation
50. Which phase of a mechatronics system consists of hardware designing?
[Option]
- a) Prototyping
 - b) Modeling
 - c) Simulation
 - d) Deployment
51. Who was the inventor of mechatronics?
[Option]
- a) Robert H
 - b) Testudo Mori
 - c) De Silva
 - d) W. Bolton
52. To meet the customer's demand in today's market, we need:
[Option]
- a) Rapid Manufacturing
 - b) Conventional Manufacturing
 - c) Unconditional Manufacturing
 - d) Simple manufacturing
53. What material is not used in 3D printing?
[Option]
- a) Nylon
 - b) ABS
 - c) PLA
 - d) PVC
54. An Algorithm is said as Complete algorithm if _____
[Option]
- a) It ends with a solution (if any exists).
 - b) It begins with a solution.
 - c) It does not end with a solution.
 - d) It contains a loop.
55. Standard dimensions of A3 drawing sheet in mm is
[Option]
- 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
[Option]
- 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
[Option]
- 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
[Option]
- 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
[Option]
- a) pastoral society
 - b) tribal society
 - c) horticultural society
 - d) agricultural society
60. According to NEC Act (Revised), the number of executive members in a council body is
[Option]
- a) 25
 - b) 21
 - c) 18
 - d) 15
61. Check Speed of which Intel microprocessor is 3 GHz?
[Option]
- a) Core 2 Duo
 - b) Core 2 Quad
 - c) Pentium 4
 - d) Pentium III
62. In which layer Telnet and FTP works?
[Option]
- a) Application
 - b) Session
 - c) Network
 - d) Physical

63. Fast fading occurs if the channel_____ changes rapidly within the symbol duration.
[Option]
a) Bandwidth
b) Frequency
c) Impulse Response
d) Wave Pulse
64. In a CNC machine, the punch tape reader is a:
[Option]
a) Input Device
b) Feedback System
c) Driving System
d) Program
65. Which of these filters contain entirely passive elements?
[Option]
a) Optical filter
b) Digital filter
c) Electrical filter
d) Mechanical filter
66. The first robot who got citizenship in a country is:
[Option]
a) Sophia
b) Asimo
c) Eskimo
d) Ansino
67. Structures such as gear, linkages, and belts fall under which of the following types of components in a mechatronics system?
[Option]
a) Electrical component
b) Electronic component
c) Control system
d) Mechanical components
68. Which of the following is not a sensor?
[Option]
a) Strain gauge
b) Switches
c) Servomotor
d) Potentiometer
69. How many primary types of control systems exist in mechatronics?
[Option]
a) 5
b) 4
c) 3
d) 2
70. The discrepancy between the measurement result and the real value of the quantity being measured is referred to as _____.
[Option]
a) Error
b) Resolution
c) Range
d) Precision

71. Which kind of sensor in mechatronics can detect the presence or absence of items or targets within its sensing range without requiring physical contact?
[Option]
- a) Displacement sensor
 - b) Proximity sensor
 - c) Position sensor
 - d) Speed sensor
72. Which of the following are used in machine tools for force measurement, hydraulic or pneumatic presses, and as impact sensors in aeronautical vehicles?
[Option]
- a) Potentiometer
 - b) Capacitive element sensor
 - c) Strain gauges
 - d) Optical encoders
73. Which of the following is not true about CNC (computer numerical control) machines?
[Option]
- a) CNC entails the integration of a control system
 - b) CNC machining techniques provide excellent precision and accuracy
 - c) CNC lacks sensing capabilities
 - d) Only actuators are used in CNC machines in mechatronics
74. What is the full form of PLC in mechatronics?
[Option]
- a) Programmable logic control
 - b) Process logic control
 - c) Primary line control
 - d) Process line control
75. Which phase of a mechatronics system consists of hardware designing?
[Option]
- a) Deployment
 - b) Modeling
 - c) Simulation
 - d) Prototyping
76. In mechatronics system design process the term theoretical modelling is based on
[Option]
- a) Construction
 - b) Equations
 - c) Physical principles
 - d) Experimental Data
77. Which materials-processing technology gives the advantage of precision, accuracy and optimum use of cutting tools, which maximise their life and higher labour productivity?
[Option]
- a) NC (and CNC) machine tools
 - b) Industrial robots
 - c) Flexible manufacturing systems (FMS)
 - d) Computer-integrated manufacturing (CIM)
78. The main objective(s) of Industrial robot is not
[Option]
- a) To minimise the labour requirement
 - b) To increase productivity
 - c) To enhance the life of production machines

d) To entertaining wild life

79. The type of memory, which is fast, and temporarily stores the data are immediately required for use is called as _____.

[Option]

- a) HDD
- b) ROM
- c) RAM
- d) SSD

80. The fundamental function of a tachometer is the conversion of angular _____ into voltage.

[Option]

- a) Velocity
- b) Displacement
- c) Acceleration
- d) Current

81. A servo motor is a typical example of _____

[Option]

- a) Electronics system
- b) Mechanical system
- c) Computer system
- d) Mechatronics system

82. Which is the first aspect which needs to be considered in the Mechatronics design process?

[Option]

- a) Hardware integration and simulation
- b) Conceptual design
- c) Modeling and simulation
- d) Mathematical modeling

83. The study of motion with regard to forces is known as _____?

[Option]

- a) Kinematics
- b) Dynamics
- c) Actuators
- d) Electro kinematics

84. Which of the subsequent is not a transmission shaft type?

[Option]

- a) Crankshaft
- b) Countershaft
- c) Transmission Shaft
- d) Line Shaft

85. A shaft rotates at a rate of 100 rev/min against a constant torque of 1000 N-m. The power required to rotate the shaft is.....

[Option]

- a) 9.5 kW
- b) 11.25 kW
- c) 9.0 kW
- d) 10.47 kW

86. PLC operates on the following signals.

[Option]

- a) Digital
- b) Impulse

- c) Analog
 - d) Frequency
87. A buffer amplifier has gain of
[Option]
- a) Infinite
 - b) Zero
 - c) Unity
 - d) Depend upon the circuit parameter
88. Which helps in automatically shutting down the motor when the receiver reaches the factory-set limit?
[Option]
- a) Motor
 - b) Pressure switch
 - c) Tank
 - d) Drain valve
89. Which refers to an electromagnetically actuated switch?
[Option]
- a) Push button switch
 - b) Limit switch
 - c) Relay
 - d) Solenoid
90. A robot with means to understand its environment and the ability to successfully complete a task despite changes in the surroundings is called _____.
[Option]
- a) Freely programmable robot
 - b) Numerical control robot
 - c) SCARA robot
 - d) Intelligent robot
91. Which of following is not advantage of automation?
[Option]
- a) Reduction in cost of raw material
 - b) Reduction in manufacturing lead time
 - c) Reduced inventory
 - d) Quality improvement
92. Typical scan time of a PLC ranges from _____.
[Option]
- a) 1 to 20 milli seconds
 - b) 1 to 50 milli seconds
 - c) 2 to 50 micro seconds
 - d) 1 to 100 milli seconds
93. Sequencing and control operations are performed by _____.
[Option]
- a) Computer Aided Design (CAD)
 - b) Computer Numerical Control Machine (CNC)
 - c) Computer Based Control System
 - d) Programmable Logic Controllers (PLC)
94. Which one of the following engineering deals with machinery and structure of robots?
[Option]
- a) Electrical
 - b) Computer
 - c) Mechanical

- d) Civil
95. Which of the following drawings is an axonometric and has three axis that are divided in equal angles?
[Option]
a) Dimetric
b) Isometric
c) Trimetric
d) Orthographic
96. The sectional view drawing in which one fourth of an object has been marked for removal is known as a
[Option]
a) Quarter Section
b) Full Section
c) Half Section
d) Inclined Section
97. In which of the following methods of capital budgeting, cash flows are reinvested at the cost of capital?
[Option]
a) Internal Rate of Return (IRR)
b) Net Present Value (NPV)
c) Payback Period
d) Net Future Value
98. What stands for PERT in project planning and scheduling?
[Option]
a) Program Evaluation and Review Technique
b) Project Evaluation and Revise Technique
c) Progress Evaluation and Revive Technique
d) Project Evaluation and Renew Technique
99. Which is not a code of conduct for engineers as per engineering professional practices?
[Option]
a) Politeness and Confidentiality:
b) Non-discrimination
c) Corruption
d) Professional Work
100. According to Nepal Engineering Council Rules, 2057 Clause, how many categories of the registration of engineers available?
[Option]
a) 4
b) 3
c) 2
d) 1