

**Nepal Engineering Council Registration Examination**  
**Model Question for Industrial Engineering (AInE)**

**Section A (60\*1 = 60)**

1. Which is not the common type of fit in hole and shaft?
  - a) Clearance fit
  - b) Transference fit
  - c) Transition fit
  - d) Interference fit
  
2. Steel containing 0.15% - 0.45% carbon is called .....
  - a) Mild steel
  - b) Dead mild steel
  - c) Medium carbon steel
  - d) High carbon steel
  
3. Wrought iron contains ..... of iron
  - a) 0.0999%
  - b) 0.999%
  - c) 9.99%
  - d) 99.9%
  
4. The C.G.S. unit of charge is .....
  - a) Coulomb
  - b) Erg
  - c) Franklin
  - d) Biot
  
5. The temperature of heat produced by the electric arc is of the order of .....
  - a) 6 °C – 7 °C
  - b) 60 °C – 70 °C
  - c) 600 °C – 700 °C
  - d) 6000 °C – 7000 °C
  
6. The type of organization preferred for a steel industry is .....
  - a) Line and staff
  - b) Functional
  - c) Line, staff and functional
  - d) Line
  
7. The measurement of a thermodynamic property ‘temperature’ is based on ..... thermodynamic law
  - a) Zeroth law
  - b) First law
  - c) Second law

- d) Kelvin-plank law
8. Steady state flow application device is .....
- a) Filling-in of gas cylinder
  - b) Throttling valve
  - c) Filling-out of gas cylinder
  - d) Compressor
9. Entropy of water at 0° C is assumed to be .....
- a) 1
  - b) 0
  - c) -1
  - d) 10
10. Otto cycle is also known as .....
- a) Constant pressure cycle
  - b) Constant temperature cycle
  - c) Constant volume cycle
  - d) Constant enthalpy cycle
11. The inlet valve of a four-stroke cycle petrol engine remains open for .....
- a) 30°
  - b) 130°
  - c) 230°
  - d) 300
12. A refrigerant with the highest critical pressure is .....
- a) R-11
  - b) R-12
  - c) R-22
  - d) Ammonia
13. Water pressure at any point is measured with the unit .....
- a) Bar
  - b) Newton
  - c) Cusecs
  - d) kg
14. The upper surface of weir over which water flows is known as .....
- a) Crest
  - b) Nappe
  - c) Sill
  - d) Weir-top
15. Bernoulli's theorem deals with the conservation of .....
- a) Mass

- b) Force
  - c) Momentum
  - d) Energy
16. Which of the following pipe bends will introduce maximum head loss .....
- a) 30° bend
  - b) U bend
  - c) 45° bend
  - d) 90° bend
17. Most commonly used hydro turbine in Nepal is .....
- a) Pelton
  - b) Francis
  - c) Kaplan
  - d) Turgo-impulse
18. One horse power of pump is equal to .....
- a) 75 watt
  - b) 102 watt
  - c) 550 watt
  - d) 746 watt
19. The total momentum of a system of masses (*i.e.* moving bodies) in any direction remains constant, unless acted upon by an external force in that direction. This statement is called .....
- a) Newton's first law of motion
  - b) Newton's second law of motion
  - c) Principle of conservation of energy
  - d) Principle of conservation of momentum
20. Hook's law holds good up to .....
- a) Elastic limit
  - b) Yield point
  - c) Plastic limit
  - d) Breaking point
21. The unit of moment of inertia of an area is .....
- a)  $\text{kg m}^2$
  - b)  $\text{m}^4$
  - c)  $\text{kg/m}^2$
  - d)  $\text{kg/m}^4$
22. In a reciprocating steam engine, which of the following forms a kinematic link?
- a) Cylinder and piston
  - b) Piston rod and connecting rod
  - c) Crankshaft and flywheel

- d) Flywheel and engine frame
23. In simple harmonic motion (S.H.M.), the ratio of acceleration and displacement is proportional to .....
- a)  $\omega$
  - b)  $\omega^2$
  - c)  $1/\omega^2$
  - d)  $\sqrt{\omega}$
24. The distribution of torsion shear stress is uniform in ..... section.
- a) Parallel
  - b) Rectangular
  - c) Trapezoidal
  - d) Circular
25. Which type of tolerance does a slip gauge have?
- a. Unilateral tolerance
  - b. Bilateral tolerance
  - c. Unidirectional tolerance
  - d. Trilateral tolerance
26. What is the color of acetylene gas cylinder for gas welding?
- a. Red
  - b. Black
  - c. Maroon
  - d. Blue
27. All the principal stresses are at an angle of .....
- a.  $45^\circ$
  - b.  $90^\circ$
  - c.  $135^\circ$
  - d.  $180^\circ$
28. In Electric Discharge Machining, Process tool is made up of .....
- a. Brass
  - b. Tungsten Carbide
  - c. Diamond
  - d. Heat treated alloy steel
29. Which of the following cutting conditions greatly affects the tool wear?
- a. Feed
  - b. Depth of cut
  - c. Cutting speed
  - d. Cutting distance

30. A good cutting fluid should have
- High viscosity
  - High density
  - High specific heat
  - Low thermal conductivity
31. Scientist of organizational behavior recognize that organizations are not static but dynamic and .....
- Processing
  - Systematic
  - Ever changing
  - Researching
32. Which of the following is the least likely to influence the timing of new business births?
- Government policies
  - Consumer expenditure
  - Profitability
  - Weather conditions
33. If a company develops a new technology that improves its main product, what type of Intellectual Property can be used for its protection?
- Patent
  - Copyright
  - Trademark
  - Bookmark
34. The purpose of supply chain management is to .....
- Improve quality of a product
  - Provide customer satisfaction
  - Integrate supply and demand management
  - Increase production
35. Inventory control and quality is involved in .....phase of production planning and control.
- Pre-planning
  - Monitoring
  - Planning
  - Action
36. Which of this is not a part of Statistical Process Control's 7 tools?
- Pareto chart
  - Histogram
  - Design of experiments
  - Check sheet

37. Bilateral monopoly means .....
- a. Single seller and single buyer
  - b. Single seller and two buyers
  - c. Two sellers and single buyer
  - d. Two sellers and two buyers
38. Concurrent engineering is implemented by involving a cross-functional team for design, production, testing and operational work .....
- a. During the project execution
  - b. Long before the project execution
  - c. Towards the end of the project execution
  - d. After completion of the project execution
39. The term 'value' in value engineering refers to .....
- a. Depreciation
  - b. Selling price
  - c. Cost
  - d. Utility
40. If X and Y are independent of each other, the coefficient of correlation is .....
- a. -1.0
  - b. 0.0
  - c. +1.0
  - d. 0.5
41. Work study is concerned with .....
- a. Improving present method and finding standard time
  - b. Improving production capability
  - c. Motivation of workers
  - d. Improving control
42. The quantitative information is the one which concerns the .....
- a. value of some variable
  - b. Rate of change
  - c. Condition or status of a system
  - d. Presence or absence of some specific object
43. Which law states that the pressure exerted on a liquid is transmitted equally in all the directions?
- a. Pascal's law
  - b. Boyle's law
  - c. Archimedes principle
  - d. Charles' law

44. The efficiency of a three-phase induction motor can be expected to be nearly .....
- a. 60 to 90 %
  - b. 80 to 90%
  - c. 95 to 98 %
  - d. 99 %
45. The economizer is used in boilers to .....
- a. Increase thermal efficiency of boiler
  - b. Economize on flue
  - c. Extract heat from the exhaust the gases
  - d. Increase flue gas temperature
46. Principle of 'Unit load' states that .....
- a. Materials should be moved in lots
  - b. One unit should be moved at a time
  - c. Materials should be moved in unit time
  - d. Material should be moved at unit distance
47. The energy that cannot be used to run vehicles is .....
- a. Solar energy
  - b. Chemical energy
  - c. Electrical energy
  - d. Sound energy
48. In 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. Depends upon other factors
49. For good natural ventilation, the ..... type of building preferred
- a. Flat roof
  - b. Saw tooth
  - c. Highbay
  - d. Monitor
50. Any substance which is inflammable or explosive or toxic or corrosive or radioactive, comes under .....
- a. Physical hazard
  - b. Chemical hazard
  - c. Biological hazard
  - d. Mechanical hazard

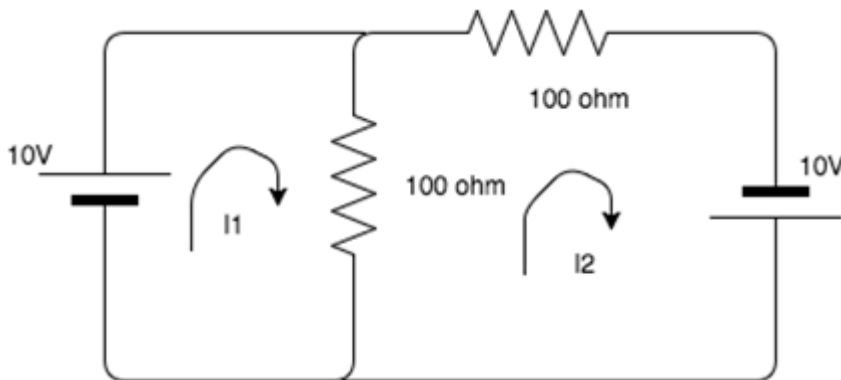
51. The following is not scheduled maintenance
- Overhauling of machine
  - Cleaning of tank
  - Whitewashing of building
  - Run-to-failure maintenance
52. How many parameters are there in Weibull distribution?
- 1
  - 2
  - 3
  - 4
53. In a vapour compression system, the highest temperature during the cycle occurs after .....
- Compression
  - Evaporation
  - Expansion
  - Condensation
54. Relative humidity on saturation curve has value of .....% at various dry bulb temperature.
- 0
  - 50
  - 10
  - 100
55. Standard dimensions (mm x mm) of A3 drawing sheet is
- $11.69 \times 16.54$
  - $29.7 \times 42$
  - $297 \times 420$
  - $420 \times 280$
56. Which of the following methods of charging depreciation of an asset has increased amount of depreciation as the age of asset increases
- Sum-of-year digit
  - Sinking fund
  - Diminishing balance
  - Straight line
57. The process of optimizing the project's limited resources without extending the project duration is known as
- Project crashing
  - Resource levelling
  - Resource smoothing
  - 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. Find the value of the currents I1 and I2.



- a) 0.3, 0.1
  - b) -0.1, -0.3
  - c) -0.3, -0.1
  - d) 0.1, 0.2
62. What is the Eutectic reaction at 1146°C?
- a)  $L (0.53\% C) + \delta(0.09\% C) \rightarrow \gamma(0.17\% C)$
  - b)  $L (4.3\% C) \rightarrow \gamma(2.1\% C) + Fe_3C (6.67\% C)$
  - c)  $\gamma (0.8\% C) \rightarrow \alpha (0.025\% C) + Fe_3C (6.67\% C)$
  - d)  $L (0.53\% C) + \delta(0.09\% C) \rightarrow \gamma (0.8\% C)$
63. The specific volume of a wet steam at 1600°C, 80% quality,  $v_f = 0.011 \text{ m}^3/\text{kg}$  and  $v_g = 0.3071 \text{ m}^3/\text{kg}$  is

- a. 1.00
  - b. 1.09
  - c. 1.25
  - d. 0.25
64. In an engine working on an ideal Otto cycle, the temperature at the beginning and at the end of the compression are  $27^{\circ}\text{C}$  and  $327^{\circ}\text{C}$ . What will be the compression ratio? (Assume constant specific heat and its ratio  $\gamma = 1.4$ )
- a.  $2^{2.5}$
  - b.  $(1/2)^{2.5}$
  - c.  $(2)^{1/1.4}$
  - d.  $(1/2)^{1/1.4}$
65. A hydro-turbine with Net head 90m and discharge 10 Cumecs will have the generation output as
- a) 7 MW
  - b) 8 MW
  - c) 9 MW
  - d) 10 MW
66. To lift a water up to 30m head with 10 lit/sec, a centrifugal pump with .... kW motor is needed.
- a) 2 kW
  - b) 4kW
  - c) 7 kW
  - d) 10 kW
67. The resultant of two forces each equal to  $P$  and acting at right angles is .....
- a)  $P/\sqrt{2}$
  - b)  $P/2$
  - c)  $2\sqrt{2} P$
  - d)  $\sqrt{2}P$
68. Two simply supported beams are of equal length. One carries a central load of  $W$  and other carries the uniformly distributed load such that total load is  $W$ . The ratio of maximum deflection in two cases is .....
- a)  $8/5$
  - b)  $8/6$
  - c)  $8/7$
  - d)  $5/4$
69. In a single point turning operation with a cemented carbide and steel combination having a Taylor exponent of 0.25, if the cutting speed is halved, then the tool life will become
- a. Eight times
  - b. Sixteen times
  - c. Half

- d. Two times
70. In Merchant equation,  $2\phi - \alpha + \beta$  is equal to
- $\pi$
  - $\pi/2$
  - $\pi/3$
  - $\pi/4$
71. When the price of a product falls by 10% and its demand rises by 30%, then the elasticity of demand is .....
- 13
  - 3
  - 10
  - 30
72. Just-in-time manufacturing is most effective in .....
- Low volume and repetitive only
  - Low volume and innovative only
  - High volume and repetitive only
  - Repetitive and innovative only
73. An XYZ television supplier found a demand of 200 sets in July, 225 sets in August and 245 sets in September. Find the demand forecast for the month for the month of October using simple average method.
- 224
  - 200
  - 175
  - 150
74. A Linear Programming Problem (LPP) is defined as: Minimize  $z = 15x_1 + 12x_2$ ; Subject to,  $X_1 + 2X_2 \leq 3$ ,  $2x_1 - 4X_2 \leq 5$ ,  $X_1, X_2 \geq 0$ . The objective function of the dual of this LPP is .....
- Maximize  $w = y_1 + y_2$
  - Maximize  $w = y_1 + 2y_2$
  - Maximize  $w = 2y_1 - 4y_2$
  - Maximize  $w = 3y_1 + 5y_2$
75. The speed of a motor falls from 1200 rpm at no-load to 1050 rpm at rated load. The speed regulation of the motor is .....
- 12.36%
  - 14.28%
  - 16.77%
  - 18.84%

76. Find the overall cost of energy per kWh when annual charges are \$30,000 and the annual energy charges are \$1,50,000:
- \$0.2
  - \$2.5
  - \$5
  - \$25
77. If unsaturated air is passed through a spray of continuously recirculated water, the specific humidity will increase while the dry bulb temperature.....
- Initially decreases then increases
  - Increases
  - Initially increases then decreases
  - Decreases
78. A product has Mean Time between Failure of 200 hours and a Mean Time to Repair of 10 hours. What is its system availability?
- 0.48
  - 0.050
  - 0.952
  - 1.050
79. Effective monthly interest rate will be ....., if nominal interest rate of 10% accounted for continuous compounding
- 1%
  - 0.84%
  - 1.2%
  - 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

- 9 days
- 10 days
- 15 days
- 24 days