

Nepal Engineering Council Registration Examination
Model Question for Mechanical Engineering (AMeE)

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) kg m^2
 - b) m^4
 - c) kg/m^2
 - d) 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) ω
 - b) ω^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. Casting process is preferred for parts having
- a) Many details
 - b) A few details
 - c) No details
 - d) Non-symmetrical shape
26. The heat treatment process used for softening hardened steel is
- a) Carburizing
 - b) Normalizing
 - c) Annealing
 - d) Tempering
27. Which of the following process is used to convert larger sections, such as ingots into smaller sections?
- a) Hot rolling
 - b) Hot forging
 - c) Squeezing
 - d) Hot extrusion
28. The process of improving the cutting action of the grinding wheel is called
- a) Truing
 - b) Dressing
 - c) Facing
 - d) Clearing
29. The commonly used flux for brazing is
- a) Resin
 - b) Soft iron
 - c) Borax
 - d) Soft silver

30. What is the full form of CNC in manufacturing?
a) Computer Number Control
b) Computer Network Control
c) Computer Numerical Control
d) Computer Neural Control
31. ISO certification is needed for
a) Quality control
b) Profit making
c) Formalities
d) Mass production
32. Which of the following component is not the mechanical power transmission system?
a) Brakes
b) Gears
c) Belt
d) Shaft
33. The function of lubrication in mechanical system is
a) Cooling
b) Increase wear and tear
c) Increase oxidation and corrosion
d) Heating
34. In a V-belt drive, belt touches
a) At bottom
b) At sides only
c) At bottom and sides
d) Could touch anywhere
35. Which is not the basic type of vibration
a) Longitudinal
b) Vertical
c) Transverse
d) Torsional
36. Which of these is not a characteristic of brainstorming?
a) There is a time limit
b) Ideas are critically evaluated
c) Quantity of ideas is foremost
d) Creativity overrides practicality
37. A systematic approach for maintenance is
a) Problem- cause-diagnosis -rectification
b) Problem-diagnosis -cause-rectification
c) Problem-measure-diagnosis-rectification

- d) Problem-diagnosis-measure-rectification
38. Which Act in Nepal covers more provisions regarding occupational safety and health?
- a) Labour Act
 - b) Electricity Act
 - c) Environment Act
 - d) Transport management Act
39. The following is not the classification of maintenance.
- a) Corrective maintenance
 - b) Timely maintenance
 - c) Condition monitoring
 - d) Scheduled maintenance
40. The reliability of the entire system is called_
- a) Partial reliability
 - b) Isolated reliability
 - c) Closed reliability
 - d) System reliability
41. What is the main objective of risk assessment?
- a) To evaluate hazard and minimize risks
 - b) Remediation of contaminated sites
 - c) Hazard management
 - d) To know source of pollutants
42. What does “NDT” stand for, in case of diagnosis of welding defects?
- a) Non-driving test
 - b) Non-destructive test
 - c) Non-dry test
 - d) Non-dial test
43. Which of the following can't fall under the head-controllable errors?
- a) Calibration errors
 - b) Environmental errors
 - c) Avoidable errors
 - d) Random errors
44. A device for determining the value or magnitude of a quantity or variable is called as
- a) Sensor
 - b) Transducer
 - c) Indicator
 - d) Instrument
45. Dynamometers are the devices that measures
- a) Displacement

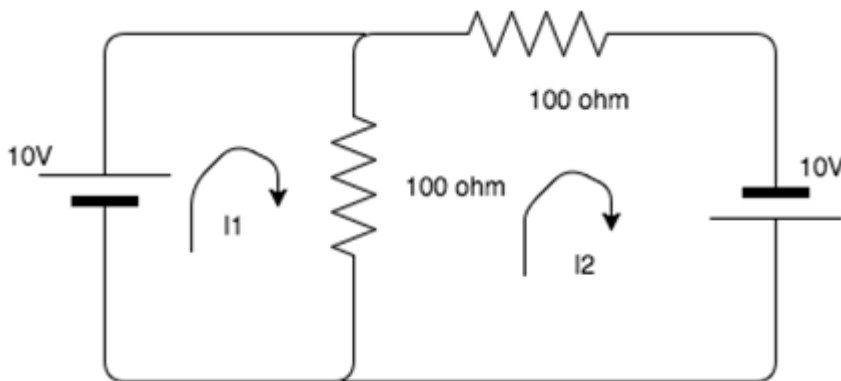
- b) Pressure
 - c) Flow
 - d) Power
46. Which of the following industries should be located near the vicinity of raw materials?
- a) Cycles
 - b) Televisions
 - c) Sewing machines
 - d) Steel mills
47. In inventory control theory, the economic order quantity is
- a) Average level of inventory
 - b) Optimum lot size
 - c) Capacity of warehouse
 - d) Lot size corresponding to break-even analysis
48. The brake power is the power available
- a) In engine cylinder
 - b) At crank pin
 - c) At crank shaft
 - d) At connecting rod
49. The overall heat transfer coefficient is used in the problems of
- a) Conduction only
 - b) Convection only
 - c) Radiation only
 - d) Conduction and convection
50. The heat flow and temperature distribution throughout the fins is time.
- a) Independent of
 - b) Directly proportional to
 - c) Square proportional to
 - d) Inversely proportional to
51. Photovoltaic energy is the conversion of sunlight into
- a) Chemical energy
 - b) Biogas
 - c) Electricity
 - d) Geothermal energy
52. Which of the following is major exhaust emissions from Diesel Engine compared to Petrol Engine?
- a) Oxides of nitrogen
 - b) Particulates
 - c) CO and CO₂

- d) Unburnt hydrocarbon
53. Which of the following oil is more viscous?
- a) SAE 40
 - b) SAE 30
 - c) SAE 80
 - d) SAE70
54. Which of the following is called the secondary air pollutant?
- a) Ethylene
 - b) Ozone
 - c) Carbon monoxide
 - d) Nitrogen dioxide
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.
- Affiliated
 - United
 - Recognized
 - Associated

Section-B (20*2 = 40)

61. Find the value of the currents I1 and I2.



- 0.3, 0.1
 - 0.1, -0.3
 - 0.3, -0.1
 - 0.1, 0.2
62. What is the Eutectic reaction at 1146°C?
- $L (0.53\% C) + \delta(0.09\% C) \rightarrow \gamma(0.17\% C)$
 - $L (4.3\% C) \rightarrow \gamma(2.1\% C) + Fe_3C (6.67\% C)$
 - $\gamma (0.8\% C) \rightarrow \alpha (0.025\% C) + Fe_3C (6.67\% C)$
 - $L (0.53\% C) + \delta(0.09\% C) \rightarrow \gamma (0.8\% C)$
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
- 1.00
 - 1.09
 - 1.25
 - 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°C and 327°C. What will be the compression ratio? (Assume constant specific heat and its ratio $\gamma = 1.4$)
- $2^{2.5}$
 - $(1/2)^{2.5}$

- 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. Find the metal removal rate from the given data (in mm*mm*mm/minute). cutting speed(cs) =50 mm/minute, depth of cut(d)=10mm, feed(f)= 0.1 mm/revolution.
- a) 5
 - b) 50
 - c) 500
 - d) 5000
70. In a welding process, the welding parameters used are: welding current = 250 A, welding voltage = 25 V and welding traverse speed = 6 mm/s. Find welding power.
- a. 6.55 kW
 - b. 65.5 kW
 - c. 62.5 kW
 - d. 6.25 kW

71. Coplanar forces equal to 7P, 8P and 5P acting on a particle are in equilibrium, then the angle between 8P and 5P is:
- 30°
 - 45°
 - 60°
 - 120°
72. What are the total degrees of freedom if the number of species are 5, total streams are 2, stream temperature 2, stream pressure 2 and heat released 1?
- 1
 - 5
 - 6
 - 12
73. A system consists of four components in series with two components having reliability of 0.9 and two others having reliability of 0.8 at the end of one year. What is the system reliability at the end of one year?
- 0.9000
 - 0.8000
 - 0.7000
 - 0.5184
74. Which of these techniques are related to magnetic particle testing?
- Yoke, Prods and Coil only
 - Yoke, Coil and Central conductor only
 - Prods, Coil, and B Central conductor only
 - Yoke, Prods, Coil and Central conductor only
75. A manufacturing company has an expected usage of 50,000 units of a certain product during next year. The cost of processing an order is Rs. 20 and the carrying cost per unit is Rs. 0.50 for one year. What will be the Economic Ordering Quantity?
- 2500 units
 - 2000 units
 - 1500 units
 - 1000 units
76. If the input and output power of an engine is 150W and 105W respectively, the efficiency of the engine will be
- 60%
 - 70%
 - 80%
 - 95%
77. 10W30 multi-grade oil means
- 10W is low temp viscosity and 30 is high temp viscosity
 - 10 is freezing point and 30 is boiling point
 - Density of oil is 30

d) Pour point is 10

78. A wire of radius 3 mm and 1.25 m length is to be maintained at 60 degree Celsius by insulating it by a material of thermal conductivity 0.175 W/m K. The temperature of surrounding is 20 degree Celsius with heat transfer coefficient 8.5 W/ m² K. Find percentage increase in heat loss due to insulation?

- a) 124.23 %
- b) 100.00 %
- c) 12.55 %
- d) 134.46 %

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