Answer Key :Mechanical Engg.

Type: Mechanical Engg.

1) A fin has 5 mm diameter and 100 mm length. The thermal conductivity of fin material is 400 W/mK, One end of the fin is maintained at 130°C and its remaining surface is exposed to ambient air at 30°C. If the convective heat transfer coefficient is 40 W/(m^2 K), the heat loss (in W) from the fin is

Options:

- 1.0.08
- 2.5
- 3.7
- 4.7.8

Correct Option: 2

Type: Mechanical Engg.

2) Critical damping is the

Options:

- 1.Largest amount of damping for which no oscillation occurs in free vibration
- 2.Smallest amount of damping for which no oscillation occurs in free vibration
- 3.Largest amount for damping for which the motion is simple harmonic in free vibration
- 4.Smallest amount of damping for which the motion is simple harmonic in free vibration

Correct Option: 2

Type: Mechanical Engg.

3) A person moving through a tuberculosis prone zone has a 50% probability of becoming infected. However, only 30% of infected people develop the disease. What percentage of people moving through a tuberculosis prone zone remains infected but does not show symptoms of disease?
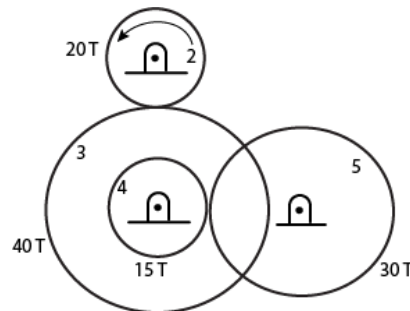
Options:

- 1.15

- 2.33
- 3.35
- 4.37

Correct Option: 3

Type: Mechanical Engg.

4) Gear 2 rotates at 1200 rpm in counter clockwise direction and engages with gear 3. Gear 3 and Gear 4 are mounted on the same shaft. Gear 5 engages with gear 4. The number of teeth on gears 2,3,4 and 5 are 20, 40,15 and 30 respectively. The angular speed of gear 5 is

Options:

- 1.300 rpm counterclockwise
- 2.300 rpm clockwise
- 3.4800 rpm counterclockwise
- 4.4800 rpm clockwise

Correct Option: 1

Type: Mechanical Engg.

5) For the same compression ratio, the efficiency of diesel cycle as compared to Otto cycle is

Options:

- 1.less
- 2.more
- 3.equal
- 4.none of the above

Correct Option: 1

Type: Mechanical Engg.

6) In an engineering stress-strain curve for mild steel, the Ultimate Tensile Strength refers to

Options:

- 1. Yield Stress
- 2.Proportional Limit
- 3. Maximum stress
- 4. Fracture Stress

Correct Option: 3

Type: Mechanical Engg.

7) The Poisson's ratio for a perfectly incompressible linear elastic material is

Options:

- 1.1
- 2.0.5
- 3.0
- 4.Infinity

Correct Option: 2

Type: Mechanical Engg.

8) For an ideal gas with constant values of specific heats, for calculation of the specific enthalpy

Options:

- 1.It is sufficient to know only the temperature
- 2.Both Temperature and pressure are required to be known
- 3. Both Temperature and volume are required to be known
- 4. Both temperature and mass are required to be known

Correct Option: 1

Type: Mechanical Engg.

9) In a counter flow heat exchanger, hot fluid enters at 60°C and cold fluid leaves at 30°C. Mass flow rate of the hot fluid is 1 kg/s and that of the cold fluid is 2 kg/s. Specific heat of the hot fluid is 10kJ/K and that of the cold fluid is 5 kJ/K. The log mean temperature difference (LMTD) for the heat exchanger in °C is

Options:

- 1.15
- 2.30
- 3.35
- 4.45

Correct Option: 2

Type: Mechanical Engg.

10) An ideal Brayton cycle, operating between the pressure limits of 1 bar and 6 bar, has minimum and maximum temperature of 300K and 1500 K. The ratio of specific heats of the working fluid is 1.4. The approximate final temperature in Kelvin at the end of the compression and expansion processes are respectively

Options:

- 1.500 and 900
- 2.900 and 500
- 3.500 and 500
- 4.900 and 900

Correct Option: 1

Type: Mechanical Engg.

11) the crank radius of a single cylinder I.C. Engine is 60 mm and the diameter of the cylinder is 80 mm. The swept volume of the cylinder in cm3 is
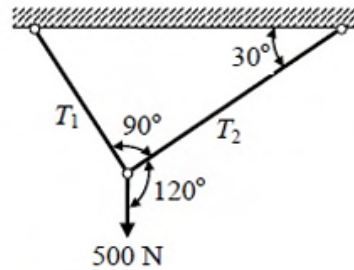
Options:

- 1.48
- 2.96
- 3.302
- 4.603

Correct Option: 4

Type: Mechanical Engg.

12) A weight of 500 N is supported by two metallic ropes as shown in figure. The values of T1 and T2 are respectively
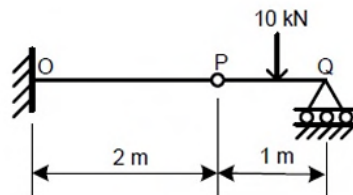
Options:

- 1.433 N and 250 N
- 2.250 N and 433 N
- 3.353.5 N and 250 N
- 4.350 N and 353.5 N

Correct Option: 1

Type: Mechanical Engg.

13) A cantilever beam OP is connected to another beam PQ with a pin joint as shown in the figure. A load of 10 kN is applied at the mid-point of PQ. The magnitude of bending moment (in kN-m) at fixed end O is

Options:

- 1.2.5
- 2.5
- 3.10
- 4.25

Correct Option: 3

Type: Mechanical Engg.

14) The correct sequence of machining operations to be performed to finish a large diameter through hole is
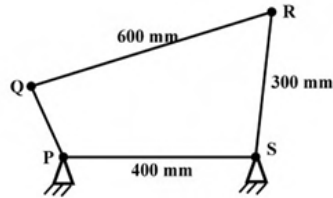
Options:

- 1.Drilling, boring, reamin
- 2.Boring, drilling, reaming
- 3. Drilling, reaming, boring
- 4.Boring, reaming, driling

Correct Option: 1

Type: Mechanical Engg.

15) A four bar Mechanism is shown below. For the mechanism to be crank-rocker mechanism, the length of the link PQ can be

Options:

- 1.80
- 2.200
- 3.300
- 4.350

Correct Option: 1

Type: Mechanical Engg.

16) In modern CNC machine tools, the backlash has been eliminated by

Options:

- 1.Preloaded ball screws
- 2. Rack and pinion
- 3.Ratchet and pinion
- 4.Slider crank mechanism

Correct Option: 1

Type: Mechanical Engg.

17) Which one of the following statements is correct for a superheated vapour?

Options:

- 1.Its pressure is less than the saturation pressure at a given temperature
- 2.Its temperature is less than the saturation temperature at a given pressure

- 3.Its volume is less than the volume of the saturated vapor at a given temperature
- 4.Its enthalpy is less than the enthalpy of the saturated vapour at a given pressure

Correct Option: 1

Type: Mechanical Engg.

18) In a linearly hardening plastic material, the true stress beyond initial yielding

Options:

- 1.Increases linearly with the true strain
- 2.Decreases linearly with the true strain
- 3.First increases linearly and then decreases linearly with the true strain
- 4.Remains constant

Correct Option: 1

Type: Mechanical Engg.

19) Which one of the following statements is TRUE?

Options:

- 1.Both Pelton and Francis turbines are impulse turbines
- 2.Francis turbine is a reaction turbine but Kaplan turbine is an impulse turbine.
- 3.Francis turbine is an axial-flow reaction turbine
- 4.Kaplan turbine is an axial-flow reaction turbine

Correct Option: 4

Type: Mechanical Engg.

20) For the stability of a floating body the

Options:

- 1.Centre of buoyancy must coincide with the centre of gravity
- 2.Centre of buoyancy must be above the centre of gravity
- 3.Centre of gravity must be above the centre of buoyancy
- 4.Metacentre must be above the centre of gravity

Correct Option: 4

Type: Mechanical Engg.

21) The most suitable electrode material used for joining low alloy steel using Gas Metal Arc Welding (GMAW) process is

Options:

- 1.Copper
- 2.Cadmium
- 3.Low alloy steel
- 4.Tungsten

Correct Option: 3

Type: Mechanical Engg.

22) Consider a Poisson distribution for the tossing of a biased coin. The mean for this distribution is μ. The standard deviation for this distribution is given by

Options:

$$\sqrt{\mu}$$

- 1.
- 2.μ2
- 3.μ
- 4.1/μ

Correct Option: 1

Type: Mechanical Engg.

23) The stroke and bore of a four stroke spark ignition engine are 250 mm and 200 mm respectively. The clearance volume is 0.001m3. If the specific heat ratio γ=1.4, the air-standard cycle efficiency of the engine is

Options:

- 1.0.464
- 2.0.561
- 3.0.582
- 4.0.628

Correct Option: 3

Type: Mechanical Engg.

24)   In abrasive jet machining, as the distance between the nozzle tip and work surface increases, the material removal rate

Options:

- 1.Increases continuously
- 2.Decreases continuously
- 3.Decreases, becomes stable and then increases
- 4.Increases, becomes stable and then decreases

Correct Option: 4

Type: Mechanical Engg.

25) In an Opaque surface, the absorptivity (α), transmissivity (τ) and reflectivity (ρ) are related by the equation:

Options:

- 1. $\alpha + \rho = \tau$
- 2. $\rho + \alpha + \tau = 0$
- 3. $\alpha + \rho = 1$
- 4. $\alpha + \rho = 0$

Correct Option: 3

Type: Mechanical Engg.

26) A solid cylinder of diameter 100 mm and height 50 mm is forged between two frictionless flat dies to a height of 25 mm. The percentage change in diameter is

Options:

- 1.0
- 2.2.07
- 3.20.7
- 4.41.4

Correct Option: 4

Type: Mechanical Engg.

27) The fluidity of molten metal of cast alloys (without any addition of fluxes) increases with increase in

Options:

- 1.Viscosity
- 2.Surface Tension
- 3.Freezing Range
- 4.Degree of superheat

Correct Option: 4

Type: Mechanical Engg.

28) The non-traditional machining process that essentially requires vacuum is

Options:

- 1.electron beam machining
- 2.electro chemical discharge machining
- 3.electro chemical machining
- 4.electro discharge machining

Correct Option: 1

Type: Mechanical Engg.

29) The function of interpolar in a CNC machine controller is to

Options:

- 1.Control spindle speed

- 2.Coordinate feed rates of axes
- 3.Control tool rapid approach speed
- 4.Perform miscellaneous (M) functions (tool change, coolant control etc.)

Correct Option: 2

Type: Mechanical Engg.

30) The spring constant of a helical compression spring DOES NOT depend on

Options:

- 1.coil diameter
- 2.material strength
- 3.number of active turns
- 4.wire diameter

Correct Option: 2

Type: Common

31) Which one of the following belongs to the category of homogeneous data

Options:

- 1.Multi-storeyed houses in a colony
- 2.Trees in a garden
- 3.Vehicular traffic on a highway
- 4.Student population in a class

Correct Option: 1

Type: Common

32) Following incomplete series is presented. Find out the number which should come at the place of question mark which will complete the series 4, 16, 36, 64,?

Options:

- 1.200
- 2.300
- 3.100
- 4.150

Correct Option: 3

Type: Common

33) In the absence of covariance among securities in the portfolio, if each security has an average standard deviation of 20%, the portfolio of 100 securities would have a standard deviation of

Options:

- 1.0.02
- 2.0.2
- 3.0.05
- 4.Zero

Correct Option: 1

Type: Common

34) In a certain code, 'bi nie pie' means 'some good jokes', 'nie bat lik' means 'some real stories', and 'pie lik tol' means 'many good stories'. Which word in that code means 'jokes'?

Options:

- 1.bi
- 2.nie
- 3.pie
- 4.None of the above

Correct Option: 1

Type: Common

35) 'Demonstrator' is related to 'Laboratory' in the same way as 'Leader' is related to

Options:

- 1.Podium
- 2.Assembly
- 3.Country
- 4.State

Correct Option: 2

Type: Common

36) A variable that is presumed to cause a change in another variable is called

Options:

- 1.A categorical variable
- 2.A dependent variable
- 3.An independent variable
- 4.An intervening variable

Correct Option: 3

Type: Common

37) The research design is

Options:

- 1.A common method adopted by all researchers to carry out research
- 2.The final choice between using qualitative or quantitative methods.
- 3.Presentation of research findings
- 4.A framework for every stage of the data collection and its analysis

Correct Option: 4

Type: Common

38) A technique of building up a list or a sample of a special population by using an initial set of members as informants is called

Options:

- 1.Quota sampling
- 2.Convenience sampling
- 3.Snowball sampling,
- 4.Purposive sampling

Correct Option: 3

Type: Common

39) In the context of Data Mining, which one of the following is a method of Data Reduction?

Options:

- 1.Data Compression
- 2.Multiple Regression
- 3.Normalization
- 4.Outlier Analysis

Correct Option: 1

Type: Common

40) A hypothesis can be described as

Options:

- 1.Just as a hunch
- 2.A wild guess
- 3.A type of statement made by researchers when they are attempting to get funding for their research
- 4. A prediction of some sort regarding the possible outcomes of a study

Correct Option: 4

Type: Common

41) Which scheme on performance and credit rating has been launched by Union MSME Ministry to assess the credit worthiness and capabilities of industries in the sector?

Options:

- 1.Zero Defect Scheme
- 2.Certification Performance and Economy Rating Scheme
- 3.Performance and Credit Rating Scheme
- 4.Industrial Incentive Scheme

Correct Option: 3

Type: Common

42) Interlocking of two or more types of food chains at different trophic levels is called

Options:

- 1.Food chain
- 2.Food web
- 3.Succession

- 4.Ecological pyramid

Correct Option: 2

Type: Common

43) A by-product of fossil fuel combustion is carbon dioxide. Which of the following is the cleanest with respect to the release of carbon dioxide?

Options:

- 1.Coal
- 2.Oil
- 3.Wood
- 4.Natural gas

Correct Option: 4

Type: Common

44) Maintaining balance between fulfilment of human needs and protection of environment is termed as

Options:

- 1.Environmental development
- 2.Sustainable development
- 3.Economic development
- 4.None of the above

Correct Option: 2

Type: Common

45) Identify the main Principle on which the Parliamentary System operates.

Options:

- 1.Responsibility of Executive to Legislature
- 2.Supremacy of Parliament
- 3.Supremacy of Judiciary
- 4.Theory of Separation of Power

Correct Option: 1

Type: Common

46) A 280 m train is moving at a speed of 80 kmph. How much time will it take to pass a bridge that is 120 m long?

Options:

- 1.30 s
- 2.32 s
- 3.18 s
- 4.40 s

Correct Option: 3

Type: Common

47) A, B, C, D and E are sitting on a bench. A is sitting next to B; C is sitting next to D, and D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting?

Options:

- 1.Between B and D
- 2.Between B and C
- 3.Between E and D
- 4.Between C and E

Correct Option: 2

Type: Common

48) If all the letters in the word 'ARGUMENT' are rearranged in alphabetical order and substituted by the letter immediately following it in English alphabet, then what will be the new arrangement of letters?

Options:

- 1.BFHNOSUV
- 2.BFHONSWV
- 3.BFHNOUSV
- 4.BFHNOQUV

Correct Option: 1

Type: Common

49) Find the odd pair of words

Options:

- 1.Room : House
- 2.Atom : Electron
- 3.Car : Engine
- 4.Milk : Water

Correct Option: 1

Type: Common

50) Vinita, who is the sister-in-law of Amit, is the daughter-in-law of Kamni. Deepak is the father of Sandy who is the only brother of Amit. How is Kalyani related to Ashok?

Options:

- 1.Mother-in-law
- 2.Aunt
- 3.Wife
- 4.None of the above

Correct Option: 4