

10 QUESTIONS LOG ANA- REASONING AND 20 Q ON ENGG MATH. PRINTED

1-30.

THEN SERIAL 31-90 THESE BRANCH QUESTIONS.

Question paper(Mechanical Engineering)

1. The resultant of two forces $(P+Q)$ and $(P-Q)$ equals $\sqrt{3P^2 + Q^2}$. The forces are then inclined to each other at the angle of
 - a. 30°
 - b. 60°
 - c. 90°
 - d. 120°

2. Two particles with masses in the ratio 1:4 are moving with equal kinetic energies. The magnitude of their linear momentums will conform to the ratio
 - a. 1:8
 - b. 1:2
 - c. $\sqrt{2}:1$
 - d. 4:1

3. Which of the following statements is wrong
 - a. Impulse equals the change in momentum
 - b. Action and reaction are equal and opposite and hence cancel each other
 - c. The momentum of a system of two bodies is conserved when there is no external force acting on either body
 - d. The work done on a particle must equal change in its kinetic energy

4. A 150 gram cricket ball moving at 20 m/s is caught by a player and the catching process is completed in 0.1second. The force of blow exerted by the ball on the hands of player is
- 3 N
 - 8 N
 - 24 N
 - 30 N
5. For a linearly elastic, isotropic and homogenous material, the number of elastic constants required to relate stress to strain is
- Two
 - Three
 - Four
 - Six
6. In a composite system subjected to temperature rise and with ends constrained to remain together, the component having lower value of coefficient of linear expansion will experience a
- Tensile stress
 - Compressive stress
 - Tensile or compressive depending upon the loading system
 - Zero value of stress
7. A metal pipe of 300 mm inner diameter contains a fluid having a pressure of 10 bar. If the permissible tensile stress in the metal is 300 bar, then the thickness of the metal required for making the pipe would be
- 5 mm

- b. 10 mm
 - c. 20 mm
 - d. 50 mm
8. A cantilever beam of rectangular cross-section is subjected to a load W at its free end. If the depth of the beam is doubled and the load is halved, the deflection of the free end as compared to original deflection will be
- a. Half
 - b. Double
 - c. One-eight
 - d. One-sixteenth
9. If N_1 and N_2 are the maximum and minimum equilibrium speeds of the flywheel, then maximum fluctuations of energy of a flywheel is proportional to
- a. $(N_1 - N_2)$
 - b. $(N_1 + N_2)$
 - c. $(N_1^2 - N_2^2)$
 - d. $(N_1^2 + N_2^2)$
10. Which of the following represents the locus of the common point on the two meshing gears?
- a. Addendum circle
 - b. Root circle
 - c. Pitch circle
 - d. Base circle

11. A point B on a rigid link AB moves with respect to point A with angular velocity 1 rad/sec and the link itself has an angular acceleration 1 rad/sec^2 . The total acceleration of B relative to A would be directed along a direction
- Parallel to AB
 - At an angle of 90° to AB
 - At an angle of 45° to AB
 - At an angle of 60° to AB
12. The ratio of length of connecting rod to crank radius in a locomotive engine is kept large to
- Achieve perfect balance
 - Minimize the effect of primary disturbing forces
 - Minimize the effect of secondary disturbing forces
 - Minimize swaying couple
13. If a spring-mass-dashpot system is subjected to excitation by a constant harmonic force, then at resonance, its amplitude of vibration will be
- Infinity
 - Inversely proportional to damping
 - Directly proportional to damping
 - Decreases exponentially with time
14. Critical speed of the shaft with a disc supported in between is equal to natural frequency of the system in
- Transverse vibrations
 - Torsional vibrations
 - Longitudinal vibrations

- d. Longitudinal vibrations , provided, the shaft is vertical
15. For forced-damped vibration system, the vibration isolation is possible only when the frequency ratio ω/ω_n
- Equals 1
 - Is less than 1
 - Is less than $\sqrt{2}$
 - Is greater than $\sqrt{5}$
16. According to Rankine theory the failure occurs at a point in a member when the maximum principal stress in a bi-axial stress system reaches the elastic limit of the material in a simple tension test. This theory of failure is used for:
- Tough materials
 - Plastic materials
 - Brittle materials
 - Ductile materials
17. Calculations for the pitch of a riveted joint are made by equating
- Tearing strength of the plate to the shearing strength of the rivet
 - shearing strength of the rivet to its crushing strength
 - Tearing strength of the plate to crushing strength of the rivet
 - shearing strength of the rivet to strength of the solid unriveted plate
18. A spur gear transmitting power is connected to the shaft with a key of rectangular cross section. The type(s) of stresses developed in the key is/are
- Shear stress alone
 - Bearing stress alone

- c. Both shear and bearing stresses
- d. Shearing, bearing and bending stresses

19. The power transmitted by a belt drive is not affected by

- a. Difference in belt tension
- b. Velocity of the belt
- c. Center distance between the pulleys
- d. Coefficient of friction

20. When subjected to shear force, a fluid

- a. Deforms continuously only for large shear forces
- b. Deforms continuously only for large shear stress
- c. Deforms continuously no matter how small the shear stress may be
- d. Undergoes static deformation

21. The pressure at the bottom of water lake is 1.5 times that at half the depth. If the water barometer reads 10 m, the depth of lake is

- a. 10 m
- b. 15 m
- c. 20 m
- d. 25 m

22. Bernoulli's equation is applicable between any two points having

- a. Rotational flow of an incompressible fluid
- b. Irrotational flow of compressible or incompressible fluid
- c. Steady rotational flow of an incompressible fluid
- d. Steady, rotational flow of an incompressible fluid

23. In a turbulent pipe flow, the velocity distribution inside the boundary layer is

- a. Linear
- b. Parabolic
- c. Logarithmic
- d. According to Prandtl's one-seventh power law

24. Boundary layer separation is caused by:

- a. Adverse pressure gradient
- b. Laminar flow changing to turbulent flow
- c. Reduction in pressure to vapour pressure
- d. Decrease in boundary layer thickness to a negligible value

25. A split bucket is used in Pelton wheel to

- a. Provide a spherical shape to the surface of spoon
- b. Minimize the axial thrust on the bearing supporting the wheel shaft
- c. Avoid the possibility of erosion from impurities present in the jet striking the buckets
- d. Prevent disturbance to incoming bucket from the deflected jet

26. If T is the absolute temperature, the molecular kinetic energy of a gas is proportional to

- a. T
- b. \sqrt{T}
- c. $T^{3/2}$
- d. T^2

27. Which of the following is a non-quasi static process?

- a. Gradual compression of gas inside a piston-cylinder arrangement
- b. Expansion of gas in a cylinder under constant pressure
- c. Free or unrestricted expansion of gas
- d. Rapid leakage of air from a bicycle tyre

28. When steam flows through a throttle valve and remains wet at exit

- a. Its temperature and quality increase
- b. Its temperature decreases but quality increases
- c. Its temperature increases but quality decreases
- d. Its temperature and quality decrease

29. In cross-compounding of steam engines

- a. The cylinders are arranged side by side
- b. The cylinders have common piston rod, connecting rod and crank
- c. The cranks are 180 degree apart
- d. A heavy flywheel is needed to even out the turning moment variation

30. In an ideal impulse turbine

- a. The absolute velocity at the inlet of moving blade is equal to that at the outlet
- b. The relative velocity at the inlet of moving blade is equal to that at the outlet
- c. Axial velocity at the inlet is equal to that at the outlet
- d. Whirl velocity at the inlet is equal to that at the outlet

31. Vapor lock refers to

- a. Supply of air-fuel mixture containing liquid particles
- b. Blocking of carburetor jets

- c. Excess supply of fuel to engine
- d. Complete or partial stoppage of fuel supply due to vaporization of fuel in the supply line

32. When a petrol engine is supplied with diesel fuel

- a. The engine will not run
- b. The engine will consume more fuel
- c. The engine will operate with reduced output
- d. The exhaust will have dense black smoke

33. In the thermodynamic analysis, a pure substance is that which

- a. Has no dissolved impurities
- b. Consists of only a single species
- c. May have a number of chemical species but the composition remains constant
- d. Behaves as a perfect gas

34. The COP of a Carnot refrigeration cycle decreases on

- a. Decreasing the difference in operating temperatures
- b. Keeping the upper temperature constant and increasing the lower temperature
- c. Increasing the upper temperature and keeping the lower temperature constant
- d. Increasing the upper temperature and decreasing the lower temperature

35. Malleability and ductility present in most of the metals is indicative of the fact that atoms of metallic lattice have

- a. Very small size
- b. Close packing
- c. A lot of inter-atomic space

- d. Capacity of slipping with respect to one another
36. Carburized machine components have high endurance limit because carburization
- a. Raise the yield point of material
 - b. Produces a better surface finish
 - c. Introduces a compressive layer on the surface
 - d. Suppresses any stress concentration produced in the component
37. Centrifugally cast products have
- a. Large grain structure with high porosity
 - b. Fine grain structure with high density
 - c. Fine grain structure with low density
 - d. Segregation of slug towards the outer skin of the casting
38. Chills are used in casting moulds to
- a. Achieve directional solidification
 - b. Reduce possibility of blow holes
 - c. Reduce the freezing line
 - d. Increase the smoothness of cast surface
39. In piercing and blanking operation, the clearance between punch and die solely depends on
- a. Diameter of the hole required
 - b. Thickness of sheet metal
 - c. Number of pieces to be made
 - d. Capacity and type of press

40. Tandem drawing of wires and tubes is necessary because

- a. It is not possible to reduce at one stage
- b. Annealing is needed between stages
- c. Surface finish improves after every drawing stage
- d. Accuracy in dimensions is not possible otherwise

41. Which is not true in the context of effect of cold working on metals?

- a. Loss of ductility
- b. Increase of strength and hardness of metal
- c. Refinement in grain structure
- d. Surface finish is improved and close tolerances maintained

42. Carburizing flame is normally used to weld

- a. Stainless steel
- b. Wrought iron
- c. Copper and aluminum alloys
- d. Hard surfacing materials like stellite

43. With an increase in nose radius of single point cutting tool

- a. Tool life increases
- b. Excessive heat is generated
- c. Surface finish deteriorates
- d. Cutting speeds have to be kept small

44. The selection of tool material in EDM is based on its having

- a. High resistance

- b. Poor thermal conductivity
- c. Low melting point
- d. High electro-erosive strength

45. In case of drunken thread the value of pitch

- a. Increases
- b. Decreases
- c. Remains same
- d. Is doubled

46. Wringing of slip gauges is possible because of

- a. Adhesive material between slips
- b. Magnetic forces
- c. Partial vacuum
- d. External forces

47. Tolerances are provided on manufactured parts because

- a. It improves the quality of the component
- b. Manufacturing of components to design dimensions is practically not possible
- c. It improves the strength of the components
- d. To make it convenient for the designer

48. Forecasting implies

- a. Preparation of specifications
- b. Estimation of future work

- c. Preparation of work details
- d. Determination of time schedule for doing work

49. A dummy activity is used in PERT network to describe

- a. Precedence relationship
- b. Necessary time delay
- c. Resource restriction
- d. Resource idleness

50. In a butt welded joint, the throat of weld as compared to the size of weld bears the ratio

- a. 2:1
- b. $\sqrt{2}:1$
- c. 1:1
- d. 1:3

51. For a shaft subjected to bending moment M and twisting moment T simultaneously the equivalent bending movement is given by

- a. $\sqrt{M^2 + T^2}$
- b. $M + \sqrt{M^2 + T^2}$
- c. $M + \frac{\sqrt{M^2 + T^2}}{2}$
- d. $T + \sqrt{M^2 + T^2}$

52. The temperature drop in plain wall with uniformly distributed heat generation can be decreased by reducing

- a. Wall thickness
- b. Heat generation rate
- c. Thermal conductivity of wall material
- d. Convection coefficient at the surface

53. All the three modes of heat transfer are involved in

- a. Melting of ice
- b. Cooling of a small metal casting in a quenching bath
- c. Heat flow through the walls of a refrigerator
- d. Automobile engine equipped with a thermo-syphon cooling system

54. Material handling is higher in case of

- a. Process layout
- b. Product layout
- c. Group layout
- d. Fixed position layout

55. Gauges are used for

- a. Measuring the unknown quantity
- b. Measuring the tolerances
- c. Checking the strength of the components
- d. Checking whether the size of the components is within the limits or not

56. A diamond locating pin is used in jigs and fixtures because

- a. Diamond is very hard and wear resistant
- b. It occupies very little space

- c. It helps in assembly with tolerance on center distance
- d. It has a long life

57. In ultrasonic machining, with increasing mean grain diameter of the abrasive material, the material removal rate would

- a. Increase
- b. Decrease
- c. Increase and then decrease
- d. Decrease and then increase

58. The size of shaper is specified by

- a. Maximum travel of cutting tool
- b. Gross weight of machine
- c. Surface area that can be machined in one hour
- d. Quick return ratio

59. White cast iron contains carbon in the form of

- a. Free carbon
- b. Graphite
- c. Cementite
- d. White carbon

60. In CPM, the cost slope is determined by

- a. $\frac{\text{crash cost}}{\text{normal cost}}$
- b. $\frac{\text{crash cost} - \text{normal cost}}{\text{normal time} - \text{crash time}}$
- c. $\frac{\text{normal cost}}{\text{crash cost}}$
- d. $\frac{\text{normal cost} - \text{crash cost}}{\text{normal time} - \text{crash time}}$