ENGINEERING KNOWLEDGE TEST (EKT)
MECHANICAL STREAM

Set No 1/15 **Booklet Series 'E'**

Instructions for Candidates **Time Allotted: 45 Minutes**

1. **Total number of Questions 50. Each Question is of three marks.**
2. **One mark will be deducted for every wrong answer.**
3. **No mark will be deducted for un-attempted Question.**
4. **Do not write or make any mark on Question Paper.**

Q1. If the centre of a circle is (-6,8) and it passes through the origin, then equation to its tangent at the origin is
(a) 2y = x (b) 4y = 3x (c) 3y = 4x (d) 3x + 4y = 0

Q2. The liquid is flowing separately through each of two pipes whose diameters are in the ratio of 2:1, if the ratio of the velocities of flow in the two pipes by 1:2, then the ratio of the amounts of the liquid flowing per sec through the pipe will be
(a) 2:1 (b) 1:1 (c) 4:1 (d) 1:8

Q3. If $f(x) = x + |x^2 - 8|$ then the derivative of $f(x)$ at x=3 is
(a) 6 (b) 7 (c) 8 (d) -8

Q4. Given P(A) = 1/4, P(B)=1/3 and P(AUB)= 1/2. Value of P(A/B) is
(a) 1/4 (b) 1/3 (c) 1/6 (d) 1/7

Q5. The angle between two vectors a = i+2j-k and b=2i+j+k is
(a) 30 deg (b) 45 deg (c) 60 deg (d) 90 deg

Q6. Newton is unit of force. It is the unit in
(a) MKS system (b) CGS system (c) FPS system (d) none of these

Q7. A Farad is defined as
(a) stat coulomb /volt (b) coulomb/volt (c) coulomb x volt (d) stat coulomb x volt

Q8. Permeance of a magnetic circuit corresponds to the following quantity in electrical circuit
(a) conductivity (b) resistivity (c) conductance (d) resistance

Q9. Hydrometer is an instrument for measuring
(a) relative humidity (b) pressure of water (c) volume of liquids (d) specific gravity

Q10. Radioactivity is a property of
(a) atomic nuclei (b) excited electron (c) gamma rays (d) ultraviolet light

Q11. A bar of length '*L* ' meters extends by ' *l* 'mm under a tensile force of '*P*'. The strain produced in the bar is
(a) l/L (b) 0.1 l/L (c) 0.01 l/L (d) 0.001 l/L

Q12. A rod is enclosed centrally in a tube and the assembly is tightened by rigid washers. If the assembly is subjected to a compressive load, then
(a) rod is under compression (b) tube is under compression
(c) both rod and tube are under compression (d) tube is under tension and rod is under compression

Q13. The shear force and bending moment are zero at the free end of a cantilever beam, if it carries a
(a) point load at the free end (b) point load at the middle of its length
(c) uniformly distributed load over the whole length (d) none of the above

Q14. The moment of resistance of a balanced reinforced concrete beam is based on the stresses in
(a) steel only (b) concrete only (c) steel and concrete both (d) none of these

Q15. In a flange coupling, the flanges are coupled together by means of
(a) bolts and nuts (b) studs (c) headless taper bolts (d) none of these

Q16. A transmission shaft includes
(a) counter shaft (b) line shaft (c) over head shaft (d) all of these

Q17. A locking device in which the bottom cylindrical portion is recessed to receive the tip of the locking set screw, is called
(a) castle nut (b) jam nut (c) ring nut (d) sawn nut

Q18. In a venturiflume, the flow takes place at
(a) atmospheric pressure (b) gauge pressure
(c) absolute pressure (d) none of these

Q19. The total pressure on the top of a closed cylindrical vessel completely filled up with a liquid is
(a) directly proportional to $(\text{radius})^2$ (b) inversely proportional to $(\text{radius})^2$
(c) directly proportional to $(\text{radius})^4$ (d) inversely proportional to $(\text{radius})^4$

Q20. When the Mach number is more than 6, the flow is called
(a) subsonic flow (b) sonic flow
(c) super-sonic flow (d) hyper-sonic flow

Q21. The discharge through a convergent mouthpiece is _____ the discharge through an internal mouthpiece of the same diameter and head of water.
(a) equal to (b) one-half (c) three fourth (d) double

Q22. Which of the following statement is wrong?

(a) The spheroidising process is usually applied to high carbon tool steels which are difficult to machine
(b) In spheroidising process, the cementite in the granular form is produced in the structure of steel
(c) The annealing process causes complete recrystallisation in steels which have been severely cold worked and a new grain structure is formed
(d) none of the above

Q23. Duplex process of steel making is a combination of
(a) basic bessemer and acid open hearth processes
(b) acid bessemer and basic open hearth processes
(c) acid bessemer and acid open hearth processes
(d) basic bessemer and basic open hearth processes

Q24. The property of a material necessary for forgings, in stamping images on coins and in ornamental work, is
(a) elasticity (b) plasticity (c) ductility (d) malleability

Q25. A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act
(a) towards the wall at its upper end (b) away from the wall at its upper end
(c) downward at its upper end (d) upward at its upper end

Q26. The slope on the road surface generally provided on the curves is known as
(a) angle of friction (b) angle of repose (c) angle of banking (d) none of these

Q27. For any system of coplanar forces, the condition of equilibrium is that the
(a) algebraic sum of the horizontal components of all the forces should be zero
(b) algebraic sum of the vertical components of all the forces should be zero
(c) algebraic sum of moments of all the forces about any point should be zero
(d) all of the above

Q28. An open cycle gas turbine works on
(a) Carnot cycle (b) Otto cycle (c) Joule's cycle (d) Stirling cycle

Q29. When the gas is cooled at constant pressure,
(a) its temperature increases but volume decreases
(b) its volume increases but temperature decreases
(c) both temperature and volume increases
(d) both temperature and volume decreases

Q30. As per Charles' law, the volume of a given mass of a perfect gas varies _____ as its absolute temperature, when the absolute pressure remains constant.
(a) directly (b) indirectly (c) no relation (d) none of the above

Q31. In an extensive property of a thermodynamic system
(a) extensive heat is transferred (b) extensive work is done
(c) extensive energy is utilised (d) none of these

Q32. Rotary compressors are used for delivering
(a) small quantities of air at high pressures
(b) large quantities of air at high pressures
(c) small quantities of air at low pressures
(d) large quantities of air at low pressures

Q33. A rotary compressor is driven by an
(a) electric motor (b) engine (c) either (a) or (b) (d) none of these

Q34. In a centrifugal compressor, an increase in speed at a given pressure ratio causes
(a) increase in flow (b) decrease in flow
(c) increase in efficiency (d) increase in flow and decrease in efficiency

Q35. A large clearance Volume in a reciprocating compressor results in
(a) reduced volume flow rate (b) increased volume flow rate
(c) lower suction pressure (d) lower delivery pressure

Q36. The effect of having excess camber is
(a) excessive steering alignment torque (b) hard steering
(c) too much traction (d) uneven tyre wear

Q37. If the air-fuel mixture ignites before the spark takes place at spark plug, the condition is called
(a) detonation (b) ignition (c) pre-ignition (d) rumble

Q38. The diagram which shows the correct crank positions corresponding to the opening and closing of the valves, is known as
(a) indicator diagram (b) axial force diagram
(c) valve timing diagram (d) none of these

Q39. In value engineering, the term value refers to
(a) manufacturing cost of the product (b) selling price of the product
(c) total cost of the product (d) utility of the product

Q40. Production cost refers to prime cost plus
(a) factory overheads
(b) factory and administration overheads
(c) factory, administration and sales overheads
(d) factory, administration, sales overheads and profit

Q41. A systematic job improvement sequence will consist of
(a) motion study (b) time study (c) job enrichment (d) all of these

Q42. Cast iron during machining produces
(a) continuous chips (b) discontinuous chips
(c) continuous chips with built-up-edge (d) none of these

Q43. A single point thread cutting tool should ideally have
(a) zero rake angle (b) positive rake angle
(c) negative rake angle (d) point angle

Q44. The cutting tool in a milling machine is mounted on
(a) spindle (b) arbor (c) column (d) knee

Q45. One quick way to view the entire drawing area is to use the Zoom command by typing _____.
(a) type Z enter A enter (b) type Z enter E enter
(c) type SHOWALL enter (d) type ALL enter

Q46. When setting up a mechanical drawing in AutoCAD the drafter should set the units to _____.
(a) fractional (b) decimal (c) architectural (d) metric

Q47. In a class B push-pull amplifier, the transistors are biased slightly above cut-off to avoid
(a) crossover distortion (b) unusually high efficiency
(c) negative feedback (d) a low input impedance

Q48. The depletion-mode MOSFET
(a) can operate with only positive gate voltages
(b) can operate with only negative gate voltages
(c) cannot operate in the ohmic region
(d) can operate with positive as well as negative gate voltages

Q49. Ailerons are used to control
(a) Yaw of aircraft (b) pitch (c) roll (d) None of these

Q50. Stalling of the aerofoil occurs
(a) When the angle of attack is beyond critical angle of attack.
(b) When the angle of attack is less than critical angle of attack.
(c) Both A and B
(d) None of the above