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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

Course Code: ME352

Course Name: COMPREHENSIVE EXAM (ME)

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.
(5) Calculators are not permitted

PART A- COMMON COURSES

1. Unit normal to the surface $z = y$ in the positive direction is .....

   a) $\hat{j} + \hat{k}$ b) $-\hat{j} - \hat{k}$ c) $\hat{j} - \hat{k}$ d) $-\hat{j} + \hat{k}$

2. Particular integral of the differential equation $y'' + 2y' + y = e^x$ is .....

   a) $\frac{e^x}{2}$ b) $\frac{e^x}{3}$ c) $\frac{e^x}{4}$ d) $\frac{e^x}{6}$

3. The straight lines which are drawn from various points on the contour of an object to meet a plane are called as _____

   a) connecting lines (b) projectors c) perpendicular lines (d) hidden lines.

4. Where do the projection lines converge in a perspective sketch?

   a) The horizon line (b) The ground line c) The vanishing point (d) The eye point

5. The principle of transmissibility of force states that when a force acts upon a body its effect is

   a) Same at every point in its line of action (b) Same at every point of the body along any direction c) Different at different point in its line of action (d) Nullified by the internal forces present in the body already

6. Afree body diagram should contain all the external forces, support reactions and the _____ of the body under consideration.

   a) Internal forces (b) Internal moments c) Self weight of the body (d) None of these

7. What makes the best practice available to everyone, thereby ensuring efficiency and safety

   a) Drawings (b) Standards and Codes c) Tolerance Limit (d) Material Cost

8. Which of the following components in a "House of Quality" drives the entire QFD process?

a) Roof matrix (b) Product characteristics c) Relationship matrix (d) Customer requirements

9. Biodiversity cannot be conserved by

a) Seed bank (b) Deforestation c) Botanical Garden (d) cryopreservation

10. Which of the ISO 14000 series of standards focuses on Life Cycle Assessment

a) 14010 (b) 14020 c) 14030 (d) 14040

PART B - CORE COURSES

11. The ratio of maximum stress intensity due to suddenly applied load and due to gradually applied load is:

a) 1 b) 2 c) 1/2 d) 4

12. Strain energy stored in solid circular shaft is proportional to:

a) GJ b) 1/GJ c) $1/(GJ)^2$ d) $(GJ)^2$

13. Point of contra-flexure occurs only in:

a) Cantilever beam b) Simply supported beam c) Continuous beam d) Overhanging beam

14. If the depth and length of a simply supported beam subjected to UDL over the whole span is doubled, then the maximum bending stress in the beam is changed by a factor of:

a) 4 b) 1/4 c) 1/2 d) 1

15. The maximum principal stress theory is also known as:

a) Beltramin's theory b) St. Venant's theory c) Rankines's theory d) Von Mises theory

16. For a circular column having its ends hinged, the slenderness ratio is 160. The L/D ratio of the column is:

a) 80 b) 57 c) 40 d) 20

17. In Mohr circle method shear stresses are represented on:

a) X axis b) Y axis c) Z axis d) XY plane

18. Which one of the following law of thermodynamics forms the basis for the measurement of temperature?

a) Zeroth law of thermodynamics b) First law of thermodynamics c) Second law of thermodynamics d) Third law of thermodynamics

19. If value of polytropic index "n" is infinitely large in a polytropic process, pv^n = a constant, then the process is known as:

a) Isochoric Process b) Isobaric Process c) Isothermal Process d) Isenthalpic Process

20. The door of a running refrigerator inside an isolated room was kept open. Which of the following statements is correct?

a) The room will be cooled to the temperature inside the refrigerator
b) The room will be cooled very slightly
c) The room will be gradually warmed up
d) The temperature of the air in room will remain unaffected

21. For which one of the following process the work done for the process is zero:

a) Constant volume
b) Free expansion
c) Throttling
d) All of the above

22. In which condition the real gas behaviour deviates from the ideal gas behaviour:

a) Pressure is very low and temperature is very high
b) Pressure is very high and temperature is low
c) Pressure is very high and temperature is very high
d) Pressure is very low and temperature is very low

23. Bomb calorimeter is used to find the calorific value of:

a) Solid fuels
b) Liquid Fuels
c) Gaseous Fuels
d) All type of fuels

24. The force exerted by a jet of water on a moving vertical plate, in the direction of motion of plate is given by:

a) $\rho a V^2$
b) $\rho a V^3$
c) $\rho a (V-u)^2$
d) $\rho a (V-u)^3$

25. Cavitation damage in turbine runner occurs near the:

a) Inlet on the convex side of blades
b) Outlet on the convex side of blades
c) Inlet on the concave side of blades
d) Outlet on the concave side of blades

26. What will happen if requirements of net positive suction head (NPSH) for a given pump are not satisfied?

a) The pump will get cavitated
b) The pump will consume more power
c) The pump will not develop head
d) The pump will have a low efficiency

27. In a reciprocating pump the air vessels are used for which of the following purposes?

a) To get continuous supply of liquid at a uniform rate
b) To save the power required to drive the pump
c) To run the pump at much higher speed without any danger of separation
d) All of the above

28. The- most efficient method of compressing air is to compress it:

a) Isothermally
b) Adiabatically
c) Isentropically
d) Isochorically

29. Rotary compressor can be classified as:

a) Displacement compressor
b) Steady-flow compressor
c) Both of the above mentioned
d) None of the above mentioned

30. Critical Resolved Shear Stress (CRSS) is the ..... stress required for plastic deformation to be initiated.

a) Maximum
b) Minimum
c) Average
d) None of the above

31. Hall-Petch relationship states the relation between stress and .....

a) Grain shape b) Grain orientation c) Grain boundary d) Grain size

32. Eutectoid composition in Fe-C phase diagram occurs at:

a) 0.76 wt. % C b) 2.13 wt.% C c) 4.1 wt.% C d) 1.2 wt.% C

33. Higher the degree of deformation, recrystallization temperature is _____

a) Higher b) Lower c) No effect d) Either higher or lower

34. Factors affecting fatigue are:

a) Stress concentration b) Residual stresses c) Surface roughness d) All of the above

35. Griffith theory is for:

a) Ductile fracture b) Brittle fracture c) Cleavage d) Deformation

36. Creep occurs due to:

a) Constant load b) Varying load c) Gradual load d) Impact load

37. Given α is bend angle in radians, R is bend radius, T is sheet thickness and k is a constant related to bending, the equation for bend allowance is:

a) $\alpha^2(R+kT)$ b) $\alpha(R-kT)$ c) $\alpha^{2(}R-kT)$ d) $\alpha(R+kT)$

38. An expendable pattern is used in:

a) Slush casting b) Squeeze casting c) Centrifugal casting d) Investment casting

39. Ceramic ferrules are used in:

a) TIG welding b) Stud welding c) Arc welding d) Percussion welding

40. The major problem in hot extrusion is:

a) Design of die b) Design of punch c) Wear and tear of die d) Wear and tear of punch

41. Which of the following is not a type of rolling mill:

a) Separation rolling mill b) Three-high rolling mill c) Cluster rolling mill d) Tandem rolling mill

42. Jig is a device used to:

a) Locate and clamp the work piece and guide the tool b) Clamp the work piece c) Locate the work piece d) Hold the cutting tool

43. The acetylene cylinder is filled with ..... for stabilizing the gas.

a) Calcium carbide b) Calcium oxide c) Acetone d) Acetylene

44. A man is climbing up a ladder. When he was half way up, he starts slipping. The path traced by the man is:

a) Parabola b) Hyperbola c) Circle d) Ellipse

45. In a cam follower motion ,the follower has constant acceleration when it moves with:

a) Simple Harmonic Motion b) Cycloidal motion c) Polynomial motion d) Parabolic motion

46. The size of the cam depends on:

a) Prime circle b) Cam circle c) Pitch circle d) Base circle

47. Increase in center distance between gears with involute profile results in:

a) Increase of pressure angle b) Decrease of pressure angle c) Does not change the pressure angle d) None of these

48. Two gears A & B with equal number of teeth are in mesh and connected by arm rotating at 1rpm. Gear A is fixed. Then the rpm of Gear B is:

a) 1 b) 3 c) 2 d) 4

49. The gear train usually employed in clocks is a:

a) Simple gear train b) Sun & Planet gear train c) Reverted gear train d) Differential gear train

50. The synthesis of mechanism deals with:

a) The determination of input and output angles of a mechanism b) The determination of dimensions of the links in a mechanism c) The determination of displacement, velocity and acceleration of the links in a mechanism d) None of the above

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