Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE COMPREHENSIVE EXAMINATION, MAY 2019

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. The slope of the surface $z = xe^{-y} + 5y$ in the x-direction at the point (4,0) is

   a) 0 b) -1 c) 1 d) 2

2. The solution of $(D^2 + 1)y = 0$ is

   a) $c_1 \cos x + c_2 sin\ x$ b) $c_1 e^x + c_2 e^{-x}$ c) $(c_1 + c_2 x)e^x$ d) $(c_1 + c_2 x)e^{-x}$

3. A simple spring mass vibrating system has a natural frequency of N. if the spring stiffness is halved and the mass is doubled then the natural frequency will be

   a) N b) 0.5N c) 2N d) 0.25N

4. The proportion of second moment of area about centroidal axis to second moment of area about base of a rectangle will be

   a) 0.3 b) 0.1 c) 0.25 d) 0.08333

5. An algorithm for scheduling a set of project activities:

   a) Critical Path Method b) Crucial Practicing Method c) Centre Processing Method d) None

6. The fundamental rethinking and radical redesign of the business process to achieve dramatic improvements in critical contemporary measures of performances such as cost,quality,service and speed:

   a) Recycling b) Quality engineering c) Contemporary design d) Re - engineering

7. Composting is

   a) anaerobic degradation b) anaerobic treatment c) aerobic treatment d) an aerobic degradation process

process for solid waste treatment | for sullage | for sewage | for solid waste treatment

8. The rating system of India which is focussed on conservation and efficient energy use is

a) GRIHA b) LEED India c) IGBC d) BEE

9. In orthographic projection, each projection view represents how many dimensions of an object?

a) 1 b) 2 c) 3 d) 0

10. The front view, side view and top view of a cylinder standing on horizontal plane base on horizontal plane.

a) circle, rectangle and rectangle b) rectangle, rectangle and circle c) rectangle, circle and rectangle d) circle, triangle and triangle

PART B- CORE COURSES

11. Attractive forces between metal ions and delocalized electrons can be weakened or overcome by

a) hammer b) high temperature c) water d) All of above

12. Crystalline solids can be recognized by their

a) low boiling point b) sharp melting point c) colour d) moderate melting point

13. Annealing of steel is done to impart which of the following properties to steel?

a) Hardness b) Toughness c) Ductility d) None of the mentioned

14. Major constituent of the gun metal alloy is

a) Copper b) Nickel c) Iron d) Zinc

15. Which ferrous material doesn't show fatigue limit?

a) Cast iron b) Wrought iron c) Austenitic stainless steel d) Low carbon steel

16. Which of the following methods of melting is not used for melting titanium metal?

a) Induction method b) Vacuum arc method c) Electron beam melting d) Cupola furnace melting

17. A turbine is called impulse if at the inlet of the turbine

a) Total energy is only pressure energy b) Total energy is only kinetic energy c) Total energy is the sum of kinetic energy and pressure energy d) None of the above

18. Find the overall efficiency of a turbine if the mechanical efficiency is 80% and hydraulic efficiency is 90%

a) 88 b) 90 c) 72 d) 30

19. In a centrifugal pump casing, the flow of water leaving the impeller is

a) Rectilinear flow b) Radial flow c) Forced vortex flow d) Free vortex flow

20. Hydraulic accumulator is a device used for

a) Lifting heavy weights b) Storing the energy of a fluid in the form of pressure energy c) Increasing pressure intensity of a fluid d) Transmitting power from one shaft to another shaft

21. The most efficient method of compressing air is to compress it

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

22. The ratio of outlet whirl velocity to blade velocity in case of centrifugal compressor is called

a) Slip factor b) Velocity factor c) Velocity coefficient d) Blade effectiveness

23. A group of resistant bodies with rigid connection preventing their relative movement is called

a) Kinematic pair b) Link c) Rigid body d) Kinematic chain

24. Angle between normal to the pitch curve at a point and direction of motion of the follower

a) Pressure angle b) Angle of action c) Angle of ascent d) Angle of dwell

25. Which of the following displacement programme should be chosen for better dynamic performance of a cam and follower mechanism

a) Cycloidal b) Simple harmonic motion c) Constant velocity d) Constant acceleration and deceleration

26. The axes of the first and last gears are coaxial in

a) Simple gear train b) Compound gear train c) Reverted gear train d) Epicyclic gear train

27. In case of a worm and worm gear maximum efficiency is equal to

a) $\frac{1+\sin\phi}{1-\sin\phi}$ b) $\frac{1-\sin\phi}{1+\sin\phi}$ c) $\frac{1+\sin\phi}{\sin\phi}$ d) $\frac{\sin\phi}{1-\sin\phi}$

28. A point on the coupler is to be guided along a prescribed path in

a) Function generation b) Motion generation c) Path generation d) Overlay method

29. Work done in a quasi-static process

a) depends on the path followed b) independent of the path followed c) depends only on the initial and final states d) none of the mentioned

30. Which of the following is true in regard to the energy of an isolated system?

a) $dQ \neq 0$ b) $dW \neq 0$ c) E=constant d) all of the mentioned

31. Entropy is a

a) path function, intensive property b) path function, extensive property c) point function, intensive property d) point function, extensive property

32. The slope of the fusion curve for water is

a) negative b) positive c) zero d) none of the mentioned

33. According to the Dalton's law of partial pressures, the total pressure of a mixture of ideal gases is equal to the

a) difference of the highest and lowest pressure b) product of the partial pressures c) sum of the partial pressures d) none of the mentioned

34. When a gas undergoes continuous throttling process by a valve and its pressure and temperature are plotted, then we get a

a) isotherm b) isenthalpic c) adiabatic d) isobar

35. If a material had a modulus of elasticity of 2.1 x 10^6 kgf/cm^2 and a modulus of rigidity of 0.8 x 10^6 kgf/cm^2 ,then the approximate value of the Poisson's ratio of the material

a) 0.26 b) 0.31 c) 0.47 d) 0.5

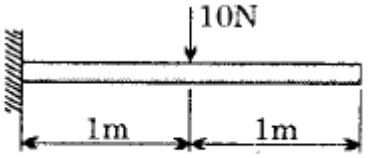
36. The diameter of shaft A is twice the diameter or shaft B and both are made of the same material. Assuming both the shafts to rotate at the same speed, the maximum power that can be transmitted by B is

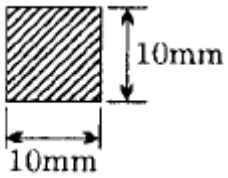
a) The same as that of A b) Half of A c) 1/8th of A d) 1/4th of A

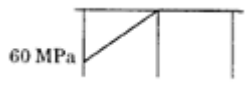
37. The given figure shows the shear force diagram for the beam ABCD. Bending moment in the portion BC of the beam

a) Is a non-zero constant b) is zero c) Varies linearly from B to C d) Varies parabolically from B to C

38. A cantilever beam has the square cross section 10mm x 10 mm. It carries a transverse load of 10 N. Considering only the bottom fibers of the beam, the correct representation of the longitudinal variation of the bending stress is





a) 

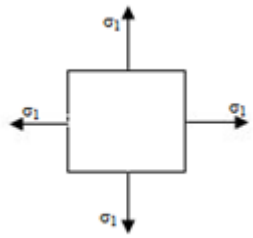
b) 

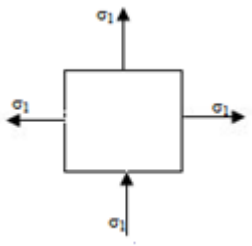
c) 

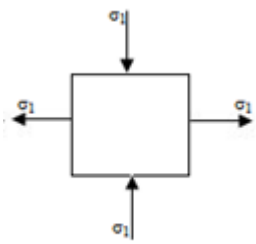
d) 

39. A material element subjected to a plane state of stress such that the maximum shear stress is equal to the maximum tensile stress, would correspond to

a) 

b) 

c) 

d) 

40. If a solid shaft can resist a bending moment of 3.0 kNm and a twisting moment of 4.0 kNm together, the maximum torque that can be applied is
    a) 7.0KNm b) 3.5kNm c) 4.5kNm d) 5kNm
41. Among the three boxes used in moulding, the middle box is known as
    a) cope b) drag c) cheek d) flange
42. Which of the following articles cannot be made from rolling?
    a) rails b) plates c) bars d) helmets
43. Which of the following metal forming processes is best suitable for making the wires?
    a) Extrution b) Drawing c) rolling d) forging
44. The following material is commonly used for making locating and clamping devices
    a) High carbon steel b) Low carbon steel c) High speed steel d) Die steel
45. What does HAZ stand for?
    a) Helium Aerated Zone b) Heat Affected Zone c) Heated Area Zone d) Heat Allowed Zone
46. The commonly used flux in brazing is
    a) Borax b) Lead sulphide c) Rosin d) Zinc chloride
47. What is the type of turbine used in Idukki hydel power project?
    a) Kaplan b) Francis c) Pelton d) None of the above
48. Insoluble impurities from solution during crystallization are removed by
    a) drying b) filtration c) heating d) cooling
49. The point on the cam with maximum pressure angle is called
    a) The pitch point b) The trace point c) Cam centre d) None of the above
50. ASTM stands for
    a) American standard for Testing Methods b) American standard for Testing and Materials c) American specification for Testing Methods d) None of the above

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