(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

A

M.Phil./Ph.D./URS-EE-Nov.-2018

SET-Z

SUBJECT : Mechanical Engineering

100041

Sr. No. ....

Time : 1¼ Hours   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

_____   _____
(Signature of the Candidate)   (Signature of the Invigilator)

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SEAL

1. A single degree of freedom system having mass 1 kg and stiffness 10 kN/m initially at rest is subjected to an impulse force of magnitude 5 kN for 10^{-4} seconds. The amplitude in mm of the resulting free vibration is :

   (1) 0.5   (2) 1.0   (3) 5.0   (4) 10.0

2. A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 rpm, the kinetic energy of the flywheel, in Joules is :

   (1) 395   (2) 790   (3) 1580   (4) 3160

3. If two forces each equal to P in magnitude act at right angles, their effect may be neutralized by a third force acting along their bisector in opposite direction whose magnitude is equal to :

   (1) 2P   (2) P/2   (3) √2P   (4) P/√2

4. A simple pendulum of length of 5 m, with a bob of mass 1 kg, is in simple harmonic motion. As it passes through its mean position, the bob has a speed of 5m/s. The net force on the bob at the mean position is :

   (1) Zero   (2) 2.5 N   (3) 5 N   (4) 25 N

5. A bullet of mass 0.03 kg moving with a speed of 400 m/s penetrates 12 cm into a fixed block of wood. The average force exerted by the wood on bullet will be :

   (1) 10 kN   (2) 20 kN   (3) 30 kN   (4) 40 kN

6. Ratio of moment of inertia of a circular body about its x-axis to that about y-axis is :

   (1) 0.5   (2) 1.0   (3) 1.5   (4) 2.0

7. The members of the truss structure are subjected to :

   (1) Bending Stress   (2) Normal Stress
   (3) Shear Stress   (4) Nominal Stress

8. The bodies which rebound after impact are called :

   (1) Inelastic bodies   (2) Elastic bodies
   (3) Imaginary bodies   (4) All of the above

9. If the end portion of a beam is extended beyond the supports, such a beam is called :

   (1) Cantilever Beam   (2) Fixed Beam
   (3) Overhanging Beam   (4) Clamped Beam

10. A cylindrical elastic body subjected to pure torsion about its axis develops :
    (1) tensile stress in a direction 45° to the axis
    (2) no tensile or compressive stress
    (3) maximum shear stress along the axis of the shaft
    (4) maximum shear stress at 45° to the axis

11. A rod of length L and diameter D is subjected to a tensile load P. Which of the following is sufficient to calculate the resulting change in diameter ?
    (1) Young's modulus
    (2) Shear modulus
    (3) Poisson's ratio
    (4) Both Young's modulus and Shear modulus

12. When two mutually perpendicular principal stresses are unequal but alike, the maximum shear stress is represented by :
    (1) the diameter of Mohr's circle
    (2) half the diameter of the Mohr's circle
    (3) there is no longitudinal strain in the material
    (4) none of these

13. If the value of Poisson's ratio is zero, then it means that :
    (1) the material is rigid
    (2) the material is perfectly plastic
    (3) there is no longitudinal strain in the material
    (4) none of these

14. A long thin walled cylindrical shell, closed at both ends, is subjected to an internal pressure. The ratio of hoop stress (circumferential stress) to longitudinal stress developed in the shell is :
    (1) 0.5   (2) 1.0   (3) 2.0   (4) 4.0

15. For a simply supported beam on two end supports, the bending moment is maximum :
    (1) Usually on the supports   (2) Always at mid span
    (3) Where there is no shear force   (4) Where the deflection is maximum

16. A simply supported beam of length 3 carries a concentrated load of 12 kN at a distance of 1 m from left support. The maximum bending moment in the beam is :
    (1) 12 kNm   (2) 24k Nm   (3) 8 kNm   (4) 16 kNm

17. A steel rod of length L and diameter D, fixed at both ends, is uniformly heated to a temperature rise of ΔT. Young's modulus is E and coefficient of linear expansion is α. The thermal stress in the rod is :

    (1) 0 (2) $\alpha \Delta T$ (3) $E\alpha \Delta T$ (4) $E\alpha \Delta T$ L

18. A free bar of length L is uniformly heated from 0°C to a temperature t°C, α is the coefficient of linear expansion and E the modulus of elasticity. The stress in the bar is :

    (1) αtE (2) $\alpha tE/2$ (3) zero (4) none of these

19. The factor which affects the critical speed of the shaft is :

    (1) Diameter of the mounted disc

    (2) Eccentricity on the shaft

    (3) Span of the shaft

    (4) All of the above

20. Torque to weight ratio for a circular shaft transmitting power is directly proportional to the :

    (1) Square root of the diameter (2) Diameter

    (3) Square of the diameter (4) Cube of the diameter

21. The fatigue life of a part can be improved by :

    (1) Electroplating (2) Polishing

    (3) Coating (4) Shot peening

22. Buttress thread is used where power is to be transmitted in :

    (1) One direction only (2) Two directions

    (3) Both the directions (4) None of the above

23. For the analysis of older plate clutches, the following theory is applicable :

    (1) Uniform Pressure Theory (2) Uniform Wear Theory

    (3) Uniform Shear Theory (4) None of the above

24. The ratio of the maximum displacement of the forced vibration to the deflection due to the static force, is known as :

    (1) Damping factor (2) Logarithmic decrement

    (3) Damping coefficient (4) Magnification factor

25. Which one of the following is the criterion in the design of hydrodynamic journal bearings ?

(1) Sommerfield numbers

(2) Rating life

(3) Specific dynamic capacity

(4) Rotation factor

26. Tooth interference in an external involute spur gear pair can be reduced by :

(1) Decreasing center distance between gear pair

(2) Decreasing module

(3) Decreasing pressure angle

(4) Increasing number of gear teeth

27. In spur gears, the circle on which the involute is generated is called the :

(1) Pitch circle

(2) Clearance angle

(3) Base circle

(4) Addendum circle

28. A static fluid can have :

(1) Non-zero normal and shear stress

(2) Negative normal stress and zero shear stress

(3) Positive normal stress and zero shear stress

(4) Zero normal stress and non-zero shear stress

29. For the stability of a floating body, under the influence of gravity alone, which of the following is true ?

(1) Metacenter should be below centre of gravity

(2) Metacenter should be above centre of gravity

(3) Metacenter and centre of gravity must lie on the same horizontal line

(4) Metacenter and centre of gravity must lie on the same vertical line

30. A fluid is one which can be defined as a substance that :

(1) Has same shear stress at all points

(2) Can deform indefinitely under the action of the smallest shear force

(3) Has the small shear stress in all direction

(4) Is practically incompressible

31. The dimension of surface tension is :

(1) ML^{-1}

(2) L^2T^{-1}

(3) $ML^{-1}T^{-1}$

(4) MT^{-2}

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32. A streamlined body is defined as a body about which :
    (1) The flow is laminar
    (2) The flow is along the streamlines
    (3) The flow separation is suppressed
    (4) The drag is zero

33. A streamline and equi-potential lines in a flow field :
    (1) Are parallel to each other
    (2) Are perpendicular to each other
    (3) Intersect at an acute angle
    (4) Are identical

34. Cavitation in a hydraulic reaction turbine is most likely to occur at the turbine :
    (1) Entry
    (2) Exit
    (3) Stator exit
    (4) Rotor exit

35. A flow in which each liquid particle has a definite path and their paths do not cross each other, is called :
    (1) Steady flow
    (2) Uniform flow
    (3) Streamline flow
    (4) Turbulent flow

36. In steady flow of a fluid, the acceleration of any fluid particle is :
    (1) Constant
    (2) Variable
    (3) Zero
    (4) Never zero

37. Bernoulli's equation cannot be applied when the flow is :
    (1) Rotational
    (2) Turbulent
    (3) Unsteady
    (4) All of these

38. A large Reynold's number is indication of :
    (1) Smooth and laminar flow
    (2) Laminar flow
    (3) Steady flow
    (4) Highly turbulent flow

39. Pitot tube is used to measure the velocity head of :
    (1) Still fluid
    (2) Laminar flow
    (3) Turbulent flow
    (4) Flowing fluid

40. Head loss in case of hot water flow through a pipe compared to cold water flow will be :
    (1) Same
    (2) More
    (3) Less
    (4) unpredictable

41. From a metallic wall at 100°C, a metallic rod protrudes to the ambient air. The temperature at the tip will be minimum when the rod is made of :
    (1) Aluminium
    (2) Steel
    (3) Copper
    (4) Silver

42. What happens when the thickness of insulation on a pipe exceeds the critical value ?
    (1) Heat transfer rate increases
    (2) Heat transfer rate decreases
    (3) Heat transfer rate remains constant
    (4) None of these

43. The process of heat transfer from one particle of the body to another without the actual motion of the particle, is known as :
    (1) Conduction
    (2) Convection
    (3) Radiation
    (4) All of these

44. Basic law of heat conduction is :
    (1) Fourier's law
    (2) Newton's law
    (3) Stefan's law
    (4) First law of thermodynamics

45. Metals are good heat conductors because :
    (1) of free electrons present
    (2) their atoms are relatively far apart
    (3) their atoms collide frequently
    (4) all of these

46. 1 micron is equal to :
    (1) 10^{-4} meters
    (2) 10^{-6} meters
    (3) 10^{-8} meters
    (4) 10^{-12} meters

47. Heat conduction does not occur :
    (1) if a physical body is impermeable to any kind of rays
    (2) if the parts of a body are not in motion relative to one another
    (3) if the bodies are kept in vacuum
    (4) if the temperature of the two bodies are identical

48. For steady flow and constant value of conductivity, the temperature distribution for a plane wall is :
    (1) Parabolic
    (2) Linear
    (3) Logarithmic
    (4) Cubic

49. The thermal conductivity in S.I. units is expressed as :
    (1) J/m^2K
    (2) W/mK
    (3) $W/m\ K\ sec$
    (4) W/m^2

50. Fin efficiency deals with :
    (1) Thermal performance
    (2) Economical material requirement
    (3) Cost of manufacturing
    (4) All of these

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51. A closed system is one, which :
    (1) Permits the passage of energy and matter across the boundaries .
    (2) Does not permit the passage of energy and matter across the boundaries
    (3) Permits the passage of energy across the boundary but does not permit the passage the matter
    (4) Permits the passage of matter across the boundary but does not permit the passage of energy

52. With rise of temperature, the specific heat of water :
    (1) Increases
    (2) Decreases
    (3) First decreases to minimum then increases
    (4) Remains constant

53. In an isothermal process, internal energy :
    (1) Increases
    (2) Remains constant
    (3) Decreases
    (4) None of the above

54. In a reversible polytropic process :
    (1) Enthalpy remains constant
    (2) Entropy remains constant
    (3) Some heat transfer occurs
    (4) Internal energy remains constant

55. Isentropic flow is :
    (1) Reversible adiabatic flow
    (2) Irreversible adiabatic flow
    (3) Frictionless fluid flow
    (4) None of the above

56. In a reversible isothermal process undergone by an ideal gas :
    (1) Heat transfer is zero
    (2) Change in internal energy is zero
    (3) Work transfer is zero
    (4) Heat transfer is equal to work transfer

57. In Carnot cycle, heat is rejected at constant :
    (1) Volume
    (2) Pressure
    (3) Temperature
    (4) Entropy

58. A gas, which obeys kinetic theory perfectly is :
    (1) Pure gas
    (2) Real gas
    (3) Perfect gas
    (4) All of these

59. The absolute zero pressure can be obtained at a temperature of :
    (1) $0°C$
    (2) $273°C$
    (3) $+273°K$
    (4) None of these

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60. In one ton refrigeration machine, the term "one ton" implies :
(1) One ton refrigerant is used
(2) One ton water can be converted into ice
(3) One ton ice when melts from and at 0°C in 24 hours, the refrigerating effects is equivalent to 3000 kcal/hour
(4) None of these

61. The temperature at which, the volume of a gas becomes zero, is called :
(1) Absolute temperature
(2) Absolute zero temperature
(3) Absolute scale of temperature
(4) None of these

62. Triple point :
(1) Occurs in a mixture of two or more gases
(2) Is a point, where three phases exists together
(3) Occurs in sublimation
(4) None of the above

63. The property of a working substance, which increases or decreases according to the heat supplied or removed in a reversible manner is called :
(1) Enthalpy
(2) Entropy
(3) Reversibility
(4) None of these

64. For a pure substance at its triple point, the number of degrees of freedom is :
(1) 0
(2) 1
(3) 2
(4) None of these

65. Process of making hollow castings of desired thickness by permanent mould without the use of cores, is called :
(1) Permanent mould casting
(2) Die casting
(3) Slush casting
(4) Centrifugal casting

66. Investment casting uses pattern made of :
(1) wax
(2) clay
(3) metal
(4) wood

67. The addition of coal dust to the green moulding sand is to improve :
(1) Permeability
(2) Surface finish
(3) Mouldability
(4) Green strength

68. The purpose of adding wood flour or saw dust to foundry sand is to improve :
(1) Mouldability
(2) Dry strength
(3) Hot strength
(4) Collapsibility

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69. Draft on pattern for casting is :

    (1) Shrinkage allowance

    (2) Identification number marked on it

    (3) Taper to facilitate its removal from mould

    (4) For machining allowance

70. Cores are used to :

    (1) Make desired recess in castings   (2) Strengthen moulding sand

    (3) Support loose pieces   (4) Remove pattern easily

71. The purpose of gate is to :

    (1) Feed the casting at a rate constant with rate of solidification

    (2) Act as reservoir for molten metal

    (3) Help to feed the casting until all solidification takes place

    (4) Feed molten metal from pouring basin to gate

72. The purpose of riser is to :

    (1) Feed the casting at a rate constant with rate of solidification

    (2) Act as reservoir for molten metal

    (3) Help to feed the casting until all solidification takes place

    (4) Feed molten metal from pouring basin to gate

73. The purpose of chaplets is to :

    (1) Provide benting   (2) Induce directional solidification

    (3) Compensate shrinkage   (4) Support the core

74. Fluidity is greatly influenced by :

    (1) Melting temperature   (2) Tapping temperature

    (3) Pouring temperature   (4) Solidification temperature

75. Sweep pattern is used for moulding parts having :

    (1) Rectangular shape   (2) Elliptical shape

    (3) Circular shape   (4) Complicated shape

76. Process of increasing the cross-section of a bar and reducing its length is called :

    (1) Spinning   (2) Upsetting   (3) Drawing   (4) Reaming

10

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77. Cold working of metal increases :
(1) Tensile strength
(2) Hardness
(3) Yielding strength
(4) All of these

78. Hot forging of steel is done at a temperature of :
(1) 400°C
(2) 600°C
(3) 1000°C
(4) 1300°C

79. In drawing operation the metal flows due to :
(1) Fluidity
(2) Work hardening
(3) Plasticity
(4) Shearing

80. Mass production of gears is done by :
(1) Turning
(2) Hobbing
(3) Shaping
(4) Forming

81. Blanking and piercing operations can be performed simultaneously in :
(1) Simple die
(2) Progressive die
(3) Compound die
(4) Combination die

82. The cutting edge of the tool is perpendicular to the direction of tool travel in :
(1) Orthogonal cutting
(2) Oblique cutting
(3) Both (1) and (2)
(4) None of these

83. In metal cutting operation discontinuous chips are produced while machining :
(1) Brittle material
(2) Ductile material
(3) Hard material
(4) Soft material

84. Material having highest cutting speed is :
(1) Cast iron
(2) Bronze
(3) Aluminium
(4) High carbon steel

85. Negative rake angles are provided to :
(1) Give better finish
(2) Increase strength of cutting tool point
(3) Decrease temperature rise at tool tip
(4) All of these

86. To prevent tool from rubbing the work piece, angle provided on tool is :
(1) Lip angle
(2) Rake angle
(3) Clearance angle
(4) Relief angle

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87. Velocity of tool relative to work piece is called :
(1) Cutting velocity
(2) Chip velocity
(3) Shear velocity
(4) Average velocity

88. Chip thickness ratio is the ratio of :
(1) Cutting velocity to chip velocity
(2) Depth of cut to chip thickness
(3) Chip thickness to depth of cut
(4) None of these

89. Tool life is said to be over if :
(1) Poor surface finish is obtained
(2) Sudden increase in power and cutting force with chattering takes place
(3) Overheating and fuming due to friction start
(4) All of these

90. Flank wear occurs mainly on :
(1) Nose part, front relief face and side relief face
(2) Nose part and top face
(3) Cutting edges
(4) All of these

91. Penetration is increased by :
(1) Increasing welding current and welding speed
(2) Increasing welding current and decreasing welding speed
(3) Decreasing welding current and welding speed
(4) Decreasing welding current and increasing welding speed

92. For resistance spot welding of 1.5 mm thick steel sheets, the current required is of the order :
(1) 10 Amp
(2) 100 Amp
(3) 1000 Amp
(4) 10,000 Amp

93. Which of the following arc welding processes does not use consumable electrodes :
(1) GMAW
(2) GTAW
(3) SAW
(4) None

94. Welding process in which flux is used in the form of granules is :
(1) Gas welding
(2) D.C. arc welding
(3) Submerged arc welding
(4) Thermit welding

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95. When the work is connected to the negative terminal and the electrode holder to the positive terminal, the welding set up is said to have :
    (1) Straight polarity
    (2) Reversed polarity
    (3) Both (1) and (2)
    (4) None of these

96. The cost commonly used criteria for measuring forecast error is :
    (1) Mean absolute deviation
    (2) Mean absolute percentage error
    (3) Mean standard error
    (4) Mean square error

97. In simple exponential smoothing forecasting, to give higher weightage to recent demand information, the smoothing constant must be close to :
    (1) -1
    (2) Zero
    (3) 0.5
    (4) 1.0

98. Setup costs do not include :
    (1) Labor cost of setting up machines
    (2) Ordering cost of raw material
    (3) Maintenance cost of the machines
    (4) Cost of processing the work piece

99. In the construction of networks, dummy activities are introduced in order to :
    (1) Compute the slack on all events
    (2) Transfer resources, if necessary, during monitoring
    (3) Clearly designate a precedence relationship
    (4) Simplify the crashing plan

100. In PERT analysis a critical activity has :
    (1) Maximum Float
    (2) Zero Float
    (3) Maximum Cost
    (4) Minimum Cost

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B

1. A rod of length L and diameter D is subjected to a tensile load P. Which of the following is sufficient to calculate the resulting change in diameter ?
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    (1) Gas welding   (2) D.C. arc welding
    (3) Submerged arc welding   (4) Thermit welding

15. When the work is connected to the negative terminal and the electrode holder to the positive terminal, the welding set up is said to have :
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    (1) -1
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18. Setup costs do not include :
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19. In the construction of networks, dummy activities are introduced in order to :
    (1) Compute the slack on all events
    (2) Transfer resources, if necessary, during monitoring
    (3) Clearly designate a precedence relationship
    (4) Simplify the crashing plan

20. In PERT analysis a critical activity has :
    (1) Maximum Float
    (2) Zero Float
    (3) Maximum Cost
    (4) Minimum Cost

21. The purpose of gate is to :
    (1) Feed the casting at a rate constant with rate of solidification
    (2) Act as reservoir for molten metal
    (3) Help to feed the casting until all solidification takes place
    (4) Feed molten metal from pouring basin to gate

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    (2) Act as reservoir for molten metal
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23. The purpose of chaplets is to :
    (1) Provide benting
    (2) Induce directional solidification
    (3) Compensate shrinkage
    (4) Support the core

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P. T. O.

4   B

24. Fluidity is greatly influenced by :
    (1) Melting temperature
    (3) Pouring temperature
                                    (2) Tapping temperature
                                    (4) Solidification temperature

25. Sweep pattern is used for moulding parts having :
    (1) Rectangular shape
    (3) Circular shape
                                    (2) Elliptical shape
                                    (4) Complicated shape

26. Process of increasing the cross-section of a bar and reducing its length is called :
    (1) Spinning   (2) Upsetting   (3) Drawing   (4) Reaming

27. Cold working of metal increases :
    (1) Tensile strength
    (3) Yielding strength
                                    (2) Hardness
                                    (4) All of these

28. Hot forging of steel is done at a temperature of :
    (1) 400°C   (2) 600°C   (3) 1000°C   (4) 1300°C

29. In drawing operation the metal flows due to :
    (1) Fluidity
    (3) Plasticity
                                    (2) Work hardening
                                    (4) Shearing

30. Mass production of gears is done by :
    (1) Turning   (2) Hobbing   (3) Shaping   (4) Forming

31. A closed system is one, which :
    (1) Permits the passage of energy and matter across the boundaries
    (2) Does not permit the passage of energy and matter across the boundaries
    (3) Permits the passage of energy across the boundary but does not permit the
        passage the matter
    (4) Permits the passage of matter across the boundary but does not permit the
        passage of energy

32. With rise of temperature, the specific heat of water :
    (1) Increases
    (2) Decreases
    (3) First decreases to minimum then increases
    (4) Remains constant

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33. In an isothermal process, internal energy :
(1) Increases
(2) Remains constant
(3) Decreases
(4) None of the above

34. In a reversible polytropic process :
(1) Enthalpy remains constant
(2) Entropy remains constant
(3) Some heat transfer occurs
(4) Internal energy remains constant

35. Isentropic flow is :
(1) Reversible adiabatic flow
(2) Irreversible adiabatic flow
(3) Frictionless fluid flow
(4) None of the above

36. In a reversible isothermal process undergone by an ideal gas :
(1) Heat transfer is zero
(2) Change in internal energy is zero
(3) Work transfer is zero
(4) Heat transfer is equal to work transfer

37. In Carnot cycle, heat is rejected at constant :
(1) Volume
(2) Pressure
(3) Temperature
(4) Entropy

38. A gas, which obeys kinetic theory perfectly is :
(1) Pure gas
(2) Real gas
(3) Perfect gas
(4) All of these

39. The absolute zero pressure can be obtained at a temperature of :
(1) 0°C
(2) 273°C
(3) +273°K
(4) None of these

40. In one ton refrigeration machine, the term "one ton" implies :
(1) One ton refrigerant is used
(2) One ton water can be converted into ice
(3) One ton ice when melts from and at 0°C in 24 hours, the refrigerating effects is equivalent to 3000 kcal/hour
(4) None of these

41. The dimension of surface tension is :
(1) ML^{-1}
(2) L^2T^{-1}
(3) $ML^{-1}T^{-1}$
(4) MT^{-2}

42. A streamlined body is defined as a body about which :
(1) The flow is laminar
(2) The flow is along the streamlines
(3) The flow separation is suppressed
(4) The drag is zero

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43. A streamline and equi-potential lines in a flow field :
  (1) Are parallel to each other
  (2) Are perpendicular to each other
  (3) Intersect at an acute angle
  (4) Are identical

44. Cavitation in a hydraulic reaction turbine is most likely to occur at the turbine :
  (1) Entry
  (2) Exit
  (3) Stator exit
  (4) Rotor exit

45. A flow in which each liquid particle has a definite path and their paths do not cross each other, is called :
  (1) Steady flow
  (2) Uniform flow
  (3) Streamline flow
  (4) Turbulent flow

46. In steady flow of a fluid, the acceleration of any fluid particle is :
  (1) Constant
  (2) Variable
  (3) Zero
  (4) Never zero

47. Bernoulli's equation cannot be applied when the flow is :
  (1) Rotational
  (2) Turbulent
  (3) Unsteady
  (4) All of these

48. A large Reynold's number is indication of :
  (1) Smooth and laminar flow
  (2) Laminar flow
  (3) Steady flow
  (4) Highly turbulent flow

49. Pitot tube is used to measure the velocity head of :
  (1) Still fluid
  (2) Laminar flow
  (3) Turbulent flow
  (4) Flowing fluid

50. Head loss in case of hot water flow through a pipe compared to cold water flow will be :
  (1) Same
  (2) More
  (3) Less
  (4) unpredictable

51. The fatigue life of a part can be improved by :
  (1) Electroplating
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  (3) Coating
  (4) Shot peening

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  (1) One direction only
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(2) Negative normal stress and zero shear stress

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(1) Metacenter should be below centre of gravity

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(3) Metacenter and centre of gravity must lie on the same horizontal line

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8

60. A fluid is one which can be defined as a substance that :

(1) Has same shear stress at all points

(2) Can deform indefinitely under the action of the smallest shear force

(3) Has the small shear stress in all direction

(4) Is practically incompressible

61. From a metallic wall at 100°C, a metallic rod protrudes to the ambient air. The temperature at the tip will be minimum when the rod is made of :

(1) Aluminium   (2) Steel   (3) Copper   (4) Silver

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(1) Heat transfer rate increases

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(3) Heat transfer rate remains constant

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63. The process of heat transfer from one particle of the body to another without the actual motion of the particle, is known as :

(1) Conduction   (2) Convection

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64. Basic law of heat conduction is :

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65. Metals are good heat conductors because :

(1) of free electrons present   (2) their atoms are relatively far apart

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66. 1 micron is equal to :

(1) 10^{-4} meters   (2) 10^{-6} meters   (3) 10^{-8} meters   (4) 10^{-12} meters

67. Heat conduction does not occur :

(1) if a physical body is impermeable to any kind of rays

(2) if the parts of a body are not in motion relative to one another

(3) if the bodies are kept in vacuum

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68. For steady flow and constant value of conductivity, the temperature distribution for a plane wall is :
    (1) Parabolic
    (2) Linear
    (3) Logarithmic
    (4) Cubic

69. The thermal conductivity in S.I. units is expressed as :
    (1) $J/m^2 K$
    (2) W/mK
    (3) $W/m\, K\, sec$
    (4) W/m^2

70. Fin efficiency deals with :
    (1) Thermal performance
    (2) Economical material requirement
    (3) Cost of manufacturing
    (4) All of these

71. The temperature at which, the volume of a gas becomes zero, is called :
    (1) Absolute temperature
    (2) Absolute zero temperature
    (3) Absolute scale of temperature
    (4) None of these

72. Triple point :
    (1) Occurs in a mixture of two or more gases
    (2) Is a point, where three phases exists together
    (3) Occurs in sublimation
    (4) None of the above

73. The property of a working substance, which increases or decreases according to the heat supplied or removed in a reversible manner is called :
    (1) Enthalpy
    (2) Entropy
    (3) Reversibility
    (4) None of these

74. For a pure substance at its triple point, the number of degrees of freedom is :
    (1) 0
    (2) 1
    (3) 2
    (4) None of these

75. Process of making hollow castings of desired thickness by permanent mould without the use of cores, is called :
    (1) Permanent mould casting
    (2) Die casting
    (3) Slush casting
    (4) Centrifugal casting

76. Investment casting uses pattern made of :
    (1) wax
    (2) clay
    (3) metal
    (4) wood

77. The addition of coal dust to the green moulding sand is to improve :
    (1) Permeability
    (2) Surface finish
    (3) Mouldability
    (4) Green strength

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78. The purpose of adding wood flour or saw dust to foundry sand is to improve :
    (1) Mouldability
    (2) Dry strength
    (3) Hot strength
    (4) Collapsibility

79. Draft on pattern for casting is :
    (1) Shrinkage allowance
    (2) Identification number marked on it
    (3) Taper to facilitate its removal from mould .
    (4) For machining allowance

80. Cores are used to :
    (1) Make desired recess in castings
    (2) Strengthen moulding sand
    (3) Support loose pieces
    (4) Remove pattern easily

81. A single degree of freedom system having mass 1 kg and stiffness 10 kN/m initially at rest is subjected to an impulse force of magnitude 5 kN for 10^{-4} seconds. The amplitude in mm of the resulting free vibration is :
    (1) 0.5
    (2) 1.0
    (3) 5.0
    (4) 10.0

82. A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 rpm, the kinetic energy of the flywheel, in Joules is :
    (1) 395
    (2) 790
    (3) 1580
    (4) 3160

83. If two forces each equal to P in magnitude act at right angles, their effect may be neutralized by a third force acting along their bisector in opposite direction whose magnitude is equal to :
    (1) 2P
    (2) P/2
    (3) $\sqrt{2}$P
    (4) P/$\sqrt{2}$

84. A simple pendulum of length of 5 m, with a bob of mass 1 kg, is in simple harmonic motion. As it passes through its mean position, the bob has a speed of 5m/s. The net force on the bob at the mean position is :
    (1) Zero
    (2) 2.5 N
    (3) 5 N
    (4) 25 N

85. A bullet of mass 0.03 kg moving with a speed of 400 m/s penetrates 12 cm into a fixed block of wood. The average force exerted by the wood on bullet will be :
    (1) 10 kN
    (2) 20 kN
    (3) 30 kN
    (4) 40 kN

B

86. Ratio of moment of inertia of a circular body about its x-axis to that about y-axis is :
    (1) 0.5   (2) 1.0   (3) 1.5   (4) 2.0

87. The members of the truss structure are subjected to :
    (1) Bending Stress   (2) Normal Stress
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88. The bodies which rebound after impact are called :
    (1) Inelastic bodies   (2) Elastic bodies
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    (1) Cantilever Beam   (2) Fixed Beam
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90. A cylindrical elastic body subjected to pure torsion about its axis develops :
    (1) tensile stress in a direction 45° to the axis
    (2) no tensile or compressive stress
    (3) maximum shear stress along the axis of the shaft
    (4) maximum shear stress at 45° to the axis

91. Blanking and piercing operations can be performed simultaneously in :
    (1) Simple die   (2) Progressive die
    (3) Compound die   (4) Combination die

92. The cutting edge of the tool is perpendicular to the direction of tool travel in :
    (1) Orthogonal cutting   (2) Oblique cutting
    (3) Both (1) and (2)   (4) None of these

93. In metal cutting operation discontinuous chips are produced while machining :
    (1) Brittle material   (2) Ductile material
    (3) Hard material   (4) Soft material

94. Material having highest cutting speed is :
    (1) Cast iron   (2) Bronze
    (3) Aluminium   (4) High carbon steel

12

95. Negative rake angles are provided to :
    (1) Give better finish
    (2) Increase strength of cutting tool point
    (3) Decrease temperature rise at tool tip
    (4) All of these

96. To prevent tool from rubbing the work piece, angle provided on tool is :
    (1) Lip angle
    (2) Rake angle
    (3) Clearance angle
    (4) Relief angle

97. Velocity of tool relative to work piece is called :
    (1) Cutting velocity
    (2) Chip velocity
    (3) Shear velocity
    (4) Average velocity

98. Chip thickness ratio is the ratio of :
    (1) Cutting velocity to chip velocity
    (2) Depth of cut to chip thickness
    (3) Chip thickness to depth of cut
    (4) None of these

99. Tool life is said to be over if :
    (1) Poor surface finish is obtained
    (2) Sudden increase in power and cutting force with chattering takes place
    (3) Overheating and fuming due to friction start
    (4) All of these

100. Flank wear occurs mainly on :
    (1) Nose part, front relief face and side relief face
    (2) Nose part and top face
    (3) Cutting edges
    (4) All of these

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C

M.Phil./Ph.D./URS-EE-Nov.-2018

SET-Z

SUBJECT : Mechanical Engineering

100003

Sr. No. ....

Time : 1¼ Hours   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

_____   _____
(Signature of the Candidate)   (Signature of the Invigilator)

SEAL

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. *All questions are compulsory.*

2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.

3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.

5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.

8. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained* **30** *minutes after starting of the examination.*

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C
1

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(1) Increasing welding current and welding speed

(2) Increasing welding current and decreasing welding speed

(3) Decreasing welding current and welding speed

(4) Decreasing welding current and increasing welding speed

32. For resistance spot welding of 1.5 mm thick steel sheets, the current required is of the order :

(1) 10 Amp   (2) 100 Amp

(3) 1000 Amp   (4) 10,000 Amp

33. Which of the following arc welding processes does not use consumable electrodes :
    (1) GMAW
    (2) GTAW
    (3) SAW
    (4) None

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P.T.O.

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9

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(3) Shear velocity　　　　　　(4) Average velocity

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80. Flank wear occurs mainly on :

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81. A rod of length L and diameter D is subjected to a tensile load P. Which of the following is sufficient to calculate the resulting change in diameter ?

(1) Young's modulus

(2) Shear modulus

(3) Poisson's ratio

(4) Both Young's modulus and Shear modulus

82. When two mutually perpendicular principal stresses are unequal but alike, the maximum shear stress is represented by :

(1) the diameter of Mohr's circle

(2) half the diameter of the Mohr's circle

(3) there is no longitudinal strain in the material

(4) none of these

83. If the value of Poisson's ratio is zero, then it means that :

(1) the material is rigid

(2) the material is perfectly plastic

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84. A long thin walled cylindrical shell, closed at both ends, is subjected to an internal pressure. The ratio of hoop stress (circumferential stress) to longitudinal stress developed in the shell is :

(1) 0.5   (2) 1.0   (3) 2.0   (4) 4.0

85. For a simply supported beam on two end supports, the bending moment is maximum :
    (1) Usually on the supports
    (2) Always at mid span
    (3) Where there is no shear force
    (4) Where the deflection is maximum

86. A simply supported beam of length 3 carries a concentrated load of 12 kN at a distance of 1 m from left support. The maximum bending moment in the beam is :
    (1) 12 kNm
    (2) 24 kNm
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87. A steel rod of length L and diameter D, fixed at both ends, is uniformly heated to a temperature rise of ΔT. Young's modulus is E and coefficient of linear expansion is α. The thermal stress in the rod is :
    (1) 0
    (2) $\alpha \Delta T$
    (3) $E\alpha \Delta T$
    (4) $E\alpha \Delta T L$

88. A free bar of length L is uniformly heated from 0°C to a temperature t°C, α is the coefficient of linear expansion and E the modulus of elasticity. The stress in the bar is :
    (1) αtE
    (2) $\alpha tE/2$
    (3) zero
    (4) none of these

89. The factor which affects the critical speed of the shaft is :
    (1) Diameter of the mounted disc
    (2) Eccentricity on the shaft
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    (4) All of the above

90. Torque to weight ratio for a circular shaft transmitting power is directly proportional to the :
    (1) Square root of the diameter
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91. A closed system is one, which :
    (1) Permits the passage of energy and matter across the boundaries
    (2) Does not permit the passage of energy and matter across the boundaries
    (3) Permits the passage of energy across the boundary but does not permit the passage the matter
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92. With rise of temperature, the specific heat of water :
    (1) Increases
    (2) Decreases
    (3) First decreases to minimum then increases
    (4) Remains constant

C

93. In an isothermal process, internal energy :
    (1) Increases
    (2) Remains constant
    (3) Decreases
    (4) None of the above

94. In a reversible polytropic process :
    (1) Enthalpy remains constant
    (2) Entropy remains constant
    (3) Some heat transfer occurs
    (4) Internal energy remains constant

95. Isentropic flow is :
    (1) Reversible adiabatic flow
    (2) Irreversible adiabatic flow
    (3) Frictionless fluid flow
    (4) None of the above

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    (1) Heat transfer is zero
    (2) Change in internal energy is zero
    (3) Work transfer is zero
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97. In Carnot cycle, heat is rejected at constant :
    (1) Volume
    (2) Pressure
    (3) Temperature
    (4) Entropy

98. A gas, which obeys kinetic theory perfectly is :
    (1) Pure gas
    (2) Real gas
    (3) Perfect gas
    (4) All of these

99. The absolute zero pressure can be obtained at a temperature of :
    (1) 0°C
    (2) 273°C
    (3) +273°K
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100. In one ton refrigeration machine, the term "one ton" implies :
    (1) One ton refrigerant is used
    (2) One ton water can be converted into ice
    (3) One ton ice when melts from and at 0°C in 24 hours, the refrigerating effects is equivalent to 3000 kcal/hour
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(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

| D | M.Phil./Ph.D./URS-EE-Nov.-2018 | SET-Z |

SUBJECT : Mechanical Engineering

Sr. No. **100068**

Time : 1¼ Hours   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

_____   _____
(Signature of the Candidate)   (Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. *All questions are compulsory.*

2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.

3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.

5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.

8. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained **30** minutes after starting of the examination.*

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SEAL

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(1) Square root of the diameter   (2) Diameter

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41. Penetration is increased by :

(1) Increasing welding current and welding speed

(2) Increasing welding current and decreasing welding speed

(3) Decreasing welding current and welding speed

(4) Decreasing welding current and increasing welding speed

42. For resistance spot welding of 1.5 mm thick steel sheets, the current required is of the order :

(1) 10 Amp   (2) 100 Amp

(3) 1000 Amp   (4) 10,000 Amp

43. Which of the following arc welding processes does not use consumable electrodes :

(1) GMAW   (2) GTAW

(3) SAW   (4) None

44. Welding process in which flux is used in the form of granules is :
    (1) Gas welding   (2) D.C. arc welding
    (3) Submerged arc welding   (4) Thermit welding

45. When the work is connected to the negative terminal and the electrode holder to the positive terminal, the welding set up is said to have :
    (1) Straight polarity   (2) Reversed polarity
    (3) Both (1) and (2)   (4) None of these

46. The cost commonly used criteria for measuring forecast error is :
    (1) Mean absolute deviation   (2) Mean absolute percentage error
    (3) Mean standard error   (4) Mean square error

47. In simple exponential smoothing forecasting, to give higher weightage to recent demand information, the smoothing constant must be close to :
    (1) -1   (2) Zero   (3) 0.5   (4) 1.0

48. Setup costs do not include :
    (1) Labor cost of setting up machines (2) Ordering cost of raw material
    (3) Maintenance cost of the machines   (4) Cost of processing the work piece

49. In the construction of networks, dummy activities are introduced in order to :
    (1) Compute the slack on all events
    (2) Transfer resources, if necessary, during monitoring
    (3) Clearly designate a precedence relationship
    (4) Simplify the crashing plan

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    (1) Maximum Float   (2) Zero Float
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52. Triple point :
   (1) Occurs in a mixture of two or more gases
   (2) Is a point, where three phases exists together
   (3) Occurs in sublimation
   (4) None of the above

53. The property of a working substance, which increases or decreases according to the heat supplied or removed in a reversible manner is called :
   (1) Enthalpy   (2) Entropy   (3) Reversibility   (4) None of these

54. For a pure substance at its triple point, the number of degrees of freedom is :
   (1) 0   (2) 1   (3) 2   (4) None of these

55. Process of making hollow castings of desired thickness by permanent mould without the use of cores, is called :
   (1) Permanent mould casting   (2) Die casting
   (3) Slush casting   (4) Centrifugal casting

56. Investment casting uses pattern made of :
   (1) wax   (2) clay   (3) metal   (4) wood

57. The addition of coal dust to the green moulding sand is to improve :
   (1) Permeability   (2) Surface finish
   (3) Mouldability   (4) Green strength

58. The purpose of adding wood flour or saw dust to foundry sand is to improve :
   (1) Mouldability   (2) Dry strength
   (3) Hot strength   (4) Collapsibility

59. Draft on pattern for casting is :
   (1) Shrinkage allowance
   (2) Identification number marked on it
   (3) Taper to facilitate its removal from mould
   (4) For machining allowance

60. Cores are used to :
   (1) Make desired recess in castings   (2) Strengthen moulding sand
   (3) Support loose pieces   (4) Remove pattern easily

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(2) Nose part and top face
(3) Cutting edges
(4) All of these

71. From a metallic wall at 100°C, a metallic rod protrudes to the ambient air. The temperature at the tip will be minimum when the rod is made of :

(1) Aluminium   (2) Steel   (3) Copper   (4) Silver

72. What happens when the thickness of insulation on a pipe exceeds the critical value ?
(1) Heat transfer rate increases
(2) Heat transfer rate decreases
(3) Heat transfer rate remains constant
(4) None of these

73. The process of heat transfer from one particle of the body to another without the actual motion of the particle, is known as :
(1) Conduction   (2) Convection
(3) Radiation   (4) All of these

74. Basic law of heat conduction is :
(1) Fourier's law   (2) Newton's law
(3) Stefan's law   (4) First law of thermodynamics

75. Metals are good heat conductors because :
(1) of free electrons present   (2) their atoms are relatively far apart
(3) their atoms collide frequently   (4) all of these

76. 1 micron is equal to :

(1) 10^{-4} meters   (2) 10^{-6} meters   (3) 10^{-8} meters   (4) 10^{-12} meters

77. Heat conduction does not occur :
(1) if a physical body is impermeable to any kind of rays
(2) if the parts of a body are not in motion relative to one another
(3) if the bodies are kept in vacuum
(4) if the temperature of the two bodies are identical

D

10

78. For steady flow and constant value of conductivity, the temperature distribution for a plane wall is :
    (1) Parabolic   (2) Linear   (3) Logarithmic   (4) Cubic

79. The thermal conductivity in S.I. units is expressed as :
    (1) J/m^2K (2) W/mK (3) $W/m\,K\,sec$ (4) W/m^2

80. Fin efficiency deals with :
    (1) Thermal performance   (2) Economical material requirement
    (3) Cost of manufacturing   (4) All of these

81. The fatigue life of a part can be improved by :
    (1) Electroplating   (2) Polishing
    (3) Coating   (4) Shot peening

82. Buttress thread is used where power is to be transmitted in :
    (1) One direction only   (2) Two directions
    (3) Both the directions   (4) None of the above

83. For the analysis of older plate clutches, the following theory is applicable :
    (1) Uniform Pressure Theory   (2) Uniform Wear Theory
    (3) Uniform Shear Theory   (4) None of the above

84. The ratio of the maximum displacement of the forced vibration to the deflection due to the static force, is known as :
    (1) Damping factor   (2) Logarithmic decrement
    (3) Damping coefficient   (4) Magnification factor

85. Which one of the following is the criterion in the design of hydrodynamic journal bearings ?
    (1) Sommerfield numbers   (2) Rating life
    (3) Specific dynamic capacity   (4) Rotation factor

86. Tooth interference in an external involute spur gear pair can be reduced by :
    (1) Decreasing center distance between gear pair
    (2) Decreasing module
    (3) Decreasing pressure angle
    (4) Increasing number of gear teeth

M.Phil./Ph.D./URS-EE-Nov.-2018/(Mech. Engg.)(SET-Z)/(D)

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87. In spur gears, the circle on which the involute is generated is called the :
- (1) Pitch circle
- (2) Clearance angle
- (3) Base circle
- (4) Addendum circle

88. A static fluid can have :
- (1) Non-zero normal and shear stress
- (2) Negative normal stress and zero shear stress
- (3) Positive normal stress and zero shear stress
- (4) Zero normal stress and non- zero shear stress

89. For the stability of a floating body, under the influence of gravity alone, which of the following is true ?
- (1) Metacenter should be below centre of gravity
- (2) Metacenter should be above centre of gravity
- (3) Metacenter and centre of gravity must lie on the same horizontal line
- (4) Metacenter and centre of gravity must lie on the same vertical line

90. A fluid is one which can be defined as a substance that :
- (1) Has same shear stress at all points
- (2) Can deform indefinitely under the action of the smallest shear force
- (3) Has the small shear stress in all direction
- (4) Is practically incompressible

91. A single degree of freedom system having mass 1 kg and stiffness 10 kN/m initially at rest is subjected to an impulse force of magnitude 5 kN for 10^{-4} seconds. The amplitude in mm of the resulting free vibration is :
- (1) 0.5
- (2) 1.0
- (3) 5.0
- (4) 10.0

92. A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 rpm, the kinetic energy of the flywheel, in Joules is :
- (1) 395
- (2) 790
- (3) 1580
- (4) 3160

93. If two forces each equal to P in magnitude act at right angles, their effect may be neutralized by a third force acting along their bisector in opposite direction whose magnitude is equal to :
- (1) 2P
- (2) P/2
- (3) √2P
- (4) P/√2

94. A simple pendulum of length of 5 m, with a bob of mass 1 kg, is in simple harmonic motion. As it passes through its mean position, the bob has a speed of 5m/s. The net force on the bob at the mean position is :

(1) Zero   (2) 2.5 N   (3) 5 N   (4) 25 N

95. A bullet of mass 0.03 kg moving with a speed of 400 m/s penetrates 12 cm into a fixed block of wood. The average force exerted by the wood on bullet will be :

(1) 10 kN   (2) 20 kN   (3) 30 kN   (4) 40 kN

96. Ratio of moment of inertia of a circular body about its x-axis to that about y-axis is :

(1) 0.5   (2) 1.0   (3) 1.5   (4) 2.0

97. The members of the truss structure are subjected to :

(1) Bending Stress   (2) Normal Stress
(3) Shear Stress   (4) Nominal Stress

98. The bodies which rebound after impact are called :

(1) Inelastic bodies   (2) Elastic bodies
(3) Imaginary bodies   (4) All of the above

99. If the end portion of a beam is extended beyond the supports, such a beam is called :

(1) Cantilever Beam   (2) Fixed Beam
(3) Overhanging Beam   (4) Clamped Beam

100. A cylindrical elastic body subjected to pure torsion about its axis develops :

(1) tensile stress in a direction 45° to the axis
(2) no tensile or compressive stress
(3) maximum shear stress along the axis of the shaft
(4) maximum shear stress at 45° to the axis

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M. Phil/ PhD/URS Entrance Examination Answer Key

Sr. No.	Set-A	Set-B	Set-C	Set-D
1	C	D	B	A
2	B	B	B	C
3	C	D	A	D
4	A	C	A	C
5	B	C	C	C
6	B	C	B	B
7	B	C	D	D
8	B	C	B	C
9	C	D	B	C
10	A	B	A	B
11	D	B	D	C
12	B	D	A	C
13	D	B	B	B
14	C	C	D	C
15	C	B	A	A
16	C	A	D	D
17	C	D	C	C
18	C	D	C	B
19	D	C	B	D
20	B	B	B	C
21	D	A	C	D
22	A	C	B	C
23	B	D	C	B
24	D	C	A	D
25	A	C	B	C
26	D	B	B	C
27	C	D	B	B
28	C	C	B	D
29	B	C	C	D
30	B	B	A	C
31	D	C	B	D
32	C	C	D	B
33	B	B	B	D
34	D	C	C	C
35	C	A	B	C
36	C	D	A	C
37	B	C	D	C
38	D	B	D	C
39	D	D	C	D
40	C	C	B	B
41	B	D	B	B
42	B	C	B	D
43	A	B	B	B
44	A	D	A	C
45	C	C	C	B
46	B	C	A	A
47	D	B	B	D
48	B	D	D	D
49	B	D	C	C
50	A	C	A	B

Sr. No.	Set-A	Set-B	Set-C	Set-D
51	C	D	D	B
52	C	A	C	B
53	B	B	B	B
54	C	D	D	A
55	A	A	C	C
56	D	D	C	A
57	C	C	B	B
58	B	C	D	D
59	D	B	D	C
60	C	B	C	A
61	B	B	A	C
62	B	B	C	A
63	B	A	D	A
64	A	A	C	C
65	C	C	C	D
66	A	B	B	D
67	B	D	D	A
68	D	B	C	B
69	C	B	C	D
70	A	A	B	A
71	A	B	C	B
72	C	B	A	B
73	D	B	A	A
74	C	A	C	A
75	C	C	D	C
76	B	A	D	B
77	D	B	A	D
78	C	D	B	B
79	C	C	D	B
80	B	A	A	A
81	C	C	D	D
82	A	B	B	A
83	A	C	D	B
84	C	A	C	D
85	D	B	C	A
86	D	B	C	D
87	A	B	C	C
88	B	B	C	C
89	D	C	D	B
90	A	A	B	B
91	B	C	C	C
92	D	A	C	B
93	B	A	B	C
94	C	C	C	A
95	B	D	A	B
96	A	D	D	B
97	D	A	C	B
98	D	B	B	B
99	C	D	D	C
100	B	A	C	A