


DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**TEST BOOKLET SERIES****TEST BOOKLET
LECT (MECH.) T.E. 2016**

Time Allowed : 2 Hours]

[Maximum Marks : 100

*All questions carry equal marks.***INSTRUCTIONS**

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. **Encode clearly the test booklet series A, B, C or D as the case may be in the appropriate place in the answer sheet.**
3. Write your Roll Number only in the box provided alongside.
Do not write anything else on the Test Booklet.
4. This Test Booklet contains **100** items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
5. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :


6. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
7. You have to mark all your responses **ONLY** on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. *Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.*
8. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking.
9. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
10. If a candidate give more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
11. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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1. Which of the following is on the bank of Ravi ?
(A) Khajiyar (B) Parel
(C) Banikhet (D) Dalhousie
2. Which pass joins Kinnaur and Tibet ?
(A) Chobu (B) Padri
(C) Shipki (D) Kunjam
3. Which raja of Chamba was killed by raja Sansar Chand of Kangra ?
(A) Raj Singh (B) Umed Singh
(C) Jit Singh (D) Sri Singh
4. Who founded the Mandi princely state at Bhinli in the thirteenth century ?
(A) Hira sen (B) Bir sen
(C) Jai sen (D) Ban sen
5. When did Ram Singh attack Shahpur and drove out the British ?
(A) July 1846 (B) December 1847
(C) August 1848 (D) January 1849

6. In which District of H.P. is Giri Bata hydel project ?
- (A) Solan (B) Sirmaur
(C) Shimla (D) Mandi
7. In which month is Minjar fair of Chamba celebrated ?
- (A) July (B) August
(C) September (D) October
8. At which place in Una District of H.P. a state-of-the Art Industrial Area is being developed ?
- (A) Pandoga (B) Lohara
(C) Mairi (D) Thanakalan
9. With which of the following initiatives is NABARD associated in H.P. ?
- (A) Micro credit
(B) Minor irrigation
(C) Development of rural infrastructure
(D) All of the above
10. In which District of H.P. was film star Yami Gautam born ?
- (A) Chamba (B) Bilaspur
(C) Shimla (D) Solan

11. Who is the author of *A State in Denial Pakistan's Misguided and Dangerous Crusade* ?
- (A) Harish Khare (B) B.G. Verghese
(C) Salman Rushdie (D) Yashwant Sinha
12. With which Indian community is the custom of Paryushan Parva associated ?
- (A) Parsis (B) Jews
(C) Sikhs (D) Jains
13. On which day is Vijay Diwas celebrated ?
- (A) September 30 (B) October 12
(C) November 9 (D) December 16
14. Which airline's tag line is 'Serving Customers with a Smile' ?
- (A) Air India (B) Jet Airways
(C) Go Air (D) Kingfisher
15. Around which year did Gandhiji set up his Sabarmati Ashram ?
- (A) 1917 (B) 1927
(C) 1929 (D) 1931

16. To which country does Mireia Lalaguna Royo who was crowned Miss World 2015 belong ?
- (A) Russia (B) Spain
(C) Indonesia (D) Jamaica
17. What was the venue of WTO summit held during December 15-19, 2015 ?
- (A) Nairobi (B) Doha
(C) Brussels (D) Paris
18. Which of the following was inducted as Deputy Prime Minister of Nepal in October, 2015 ?
- (A) Agni Kharel (B) Som Pandey
(C) Bijay Kumar Gachhadar (D) Haribol Gajurel
19. Who was sworn in as Prime Minister of Canada in November, 2015 ?
- (A) Pierre Elliot Trudeau (B) Stephen Harper
(C) Justin Trudeau (D) Margret Sinclair
20. In which of the following mosques in Nigeria bomb blast occurred in October 2015 killing at least 55 people ?
- (A) Maiduguri (B) Yola
(C) Kerawa (D) All of these

21. The position of centre of pressure of a plane surface immersed in a static fluid is :
- (A) at the centroid of the immersed surface
 - (B) always above centroid
 - (C) always below centroid
 - (D) none of the above
22. A Lewis bolt is a/an :
- (A) foundation bolt
 - (B) stud bolt
 - (C) eye bolt
 - (D) tap bolt
23. An ideal gas is filled in a balloon kept in an evacuated and insulated room. When the balloon ruptures, the gas fills up the entire room. Now internal energy of gas and the enthalpy of gas at the end of this process.
- (A) increases, increases,
 - (B) constant, decreases
 - (C) constant, constant
 - (D) decreases, increases
24. Moment of Inertia of an area dA at a distance x from a reference axis is :
- (A) $\int x dA$
 - (B) $\int x^2 dA$
 - (C) $\int x^3 dA$
 - (D) $\int x^4 dA$
25. Junker's gas calorimeter is used to determine the calorific value of :
- (A) gaseous fuels
 - (B) petrol
 - (C) coke
 - (D) all fuels

26. The acceleration, in a simple harmonic motion, is proportional to :
- (A) linear velocity (B) angular velocity
(C) displacement (D) rate of change of angular velocity
27. The weld bead between a heavy steel section and a thin section occurs mainly due to the formation of :
- (A) bainite (B) spheroidite
(C) martensite (D) none of these
28. In type of centrifugal pump the impeller is surrounded by the spiral casing.
- (A) involute (B) bevel
(C) volute (D) spur
29. In SHM is always proportional to displacement.
- (A) angular velocity (B) acceleration
(C) time period frequency (D) mass ratio
30. is used as an alloying element to enhance the endurance strength of steel materials.
- (A) Tungsten (B) Molybdenum
(C) Nickel (D) Vanadium

31. The different speeds on a lathe are provided in :
- (A) Arithmetic progression (B) Binary numbers
(C) geometric progression (D) None of these
32. The no. of inversions for a slider crank mechanism is
- (A) 4 (B) 8
(C) 6 (D) 0
33. The arm and body motion of a cylindrical configuration robot comprising of rotary motions and linear motions.
- (A) two, two (B) zero, three
(C) three, zero (D) one, two
34. In casting expendable pattern is used.
- (A) die (B) squeeze
(C) investment (D) continuous
35. The velocity of any point 'P' on a body rotating with angular velocity ' ω ' and with instantaneous centre of rotation 'I' is equal to :
- (A) IP/ω (B) $IP\omega$
(C) IP/ω^2 (D) $IP\omega^2$

36. Atomic packing factor is :
- (A) volume fraction of atoms in cell
 - (B) distance between two adjacent atoms
 - (C) Projected area fraction of atoms on a plane
 - (D) None of the above
37. Compressibility of a liquid is expressed by its :
- (A) Density
 - (B) Pressure
 - (C) Volume
 - (D) Bulk modulus of elasticity
38. During sintering of a powder metal compact, the following process takes place :
- (A) some of the pores grow
 - (B) powder particles do not melt but a bond is formed between them
 - (C) all the pores reduce in size and bond occurs due to melting
 - (D) powder particles fuse and join together
39. Power transmitted by a circular shaft is given by :
- (A) $\pi DN/60$ joules
 - (B) $2\pi NT/60$ watts
 - (C) $\pi DNT/60$ watts
 - (D) $2\pi NT/1000$ watts
40. Watt mechanism is a bar mechanism.
- (A) 3
 - (B) 4
 - (C) 5
 - (D) 8

41. The hardness of various structures in decreasing order during heat treatment of steel is :
- (A) fine pearlite, coarse pearlite, martensite, spherodite
 - (B) martensite, fine pearlite, coarse pearlite, spherodite
 - (C) fine pearlite, martensite, spherodite, coarse pearlite
 - (D) coarse pearlite, fine pearlite, martensite, spherodite
42. The most appropriate governing equation of ideal fluid flow are :
- (A) Euler's equation
 - (B) Navier Stokes' equation
 - (C) Reynolds' equation
 - (D) Hage Poissullie equation
43. In sand casting lower part of the moulding flask is called :
- (A) cope
 - (B) riser
 - (C) drag
 - (D) none of these
44. The emissivity and absorptivity of a real surface are equal for radiations with identical temperature and wavelength. This islaw.
- (A) Planck's
 - (B) Wein's
 - (C) Stefan-Boltzman's
 - (D) Kirchhoff's
45. Time dependent yield is known as :
- (A) Creep
 - (B) Fracture
 - (C) Buckling
 - (D) Fatigue

46. Spanners are manufactured by :
- (A) dry casting (B) forging
(C) sheet rolling (D) cup blanking
47. Mechanism having zero d.o.f. is known as :
- (A) Machine (B) Structure
(C) Kinematic chain (D) Link
48. The value of side rake angle of the turning tool having tool signature :
 $0^\circ, 10^\circ, 8^\circ, 6^\circ, 20^\circ, 60^\circ, 0$ (mm) will be :
- (A) 60° (B) 20°
(C) 10° (D) 8°
49. Surface tension is expressed as :
- (A) Force per unit area (B) Force per unit volume
(C) Force per unit length (D) Force only
50. In a CIM industry is also used as transportation means for work parts and tools.
- (A) AGV (B) NC machine tool
(C) RCC device (D) None of these

51. A truss having 5 joints and 7 members is termed as truss.
- (A) perfect (B) imperfect or deficient
(C) redundant (D) none of these
52. Kinematic viscosity is equal to :
- (A) density/dynamic viscosity (B) viscosity/shear stress
(C) viscosity/density (D) viscosity/velocity gradient
53. Consider a refrigerator and a heat pump working on the reversed Carnot cycle between the same temperature limits. Then :
- (A) COP of Heat Pump = COP of Refrigerator
(B) COP of Heat Pump = COP of Refrigerator - 1
(C) COP of Heat Pump = COP of Refrigerator + 1
(D) COP of Heat Pump = $1/(\text{COP of Refrigerator})$
54. These polymers cannot be recycled :
- (A) Elastomers (B) Thermoplasts
(C) Thermosets (D) All polymers

55. Turbine is a machine which converts :
- (A) Mechanical energy to hydraulic energy
 - (B) Hydraulic energy to mechanical energy
 - (C) Electrical energy to mechanical energy
 - (D) Mechanical energy to electrical energy
56. The 'flyer plate' is used welding.
- (A) Ultrasonic
 - (B) Explosive
 - (C) Electron beam
 - (D) Laser beam
57. When a body is subjected to stress in all the directions, the body is said to be under stress.
- (A) compressive
 - (B) tensile
 - (C) shear
 - (D) volumetric
58. In cutting tools, crater wear develops at :
- (A) the principal flank
 - (B) the tool nose
 - (C) the auxiliary flank
 - (D) the rake surface

59. During an isothermal expansion process of a gas :
- (A) pressure remains constant
 - (B) temperature remains constant
 - (C) both pressure and temperature remain constant
 - (D) none of the above
60. Oblique cutting system is also known as :
- (A) One-dimensional cutting system
 - (B) Two-dimensional cutting system
 - (C) Three-dimensional cutting system
 - (D) None of the above
61. Hooke's law is applicable :
- (A) Plastic range, strain is proportional to stress
 - (B) Elastic range, strain is proportional to stress
 - (C) In both elastic and plastic range, strain is proportional to stress
 - (D) None of the above
62. In an open thermodynamic system :
- (A) mass transfer takes place
 - (B) energy transfer takes place
 - (C) both mass and energy transfer takes place
 - (D) no change takes place

63. For supporting the pressure perpendicular to the axis of the shaft, the bearing preferred is :

- (A) Journal bearing (B) Pivot bearing
(C) Thrust bearing (D) Footstep bearing

64. The convexity provided on the rim of the pulley is known as :

- (A) Grooving (B) Caulking
(C) Forming (D) Crowning

65. The change in entropy is zero during process.

- (A) Polytropic (B) Adiabatic
(C) Constant pressure (D) Hyperbolic

66. In a cantilever beam the bending moment with respect to fixed end is maximum at :

- (A) the center (B) the free end
(C) the fixed end (D) any point on the beam

67. One poise is equal to :

(A) 1 Ns/m^2

(B) 10 Ns/m^2

(C) 0.1 Ns/m^2

(D) 0.01 Ns/m^2

68. Multistage compression leads to :

(A) decreased vol. efficiency for a given pressure ratio

(B) increased vol. efficiency for a given pressure ratio

(C) more cost

(D) more noise

69. Orsat apparatus is used for analyzing

(A) oxygen

(B) air

(C) carbon dioxide

(D) flue gases

70. Annealing is used to make the steel components :

(A) hard

(B) soft

(C) brittle

(D) none of these

71. Profiles used for spur gears are :
- (A) Epicycloid profiles (B) Hypocycloid profiles
(C) Thread profiles (D) Involute profiles
72. During fusion, the entropy of the system :
- (A) decreases (B) increases
(C) always remains constant (D) none of these
73. The deflection of a cantilever beam of length L , modulus of elasticity E , moment of inertia I subjected to a point load P is $PL^3/3 EI$. The strain energy due to bending is :
- (A) $5PL^3/48EI$ (B) $P^2L/3EI$
(C) $P^2L^3/6EI$ (D) $P^2L^3/48EI$
74. If flow conditions satisfy 'Laplace equation', then :
- (A) flow is rotational
(B) flow does not satisfy continuity equation
(C) flow is irrotational and satisfy continuity equation
(D) flow is irrotational and does not satisfy continuity equation

75. welding is a solid state joining process.
- (A) gas (B) friction
(C) arc (D) thermit
76. A refrigerant moving in a refrigerator follows :
- (A) open system
(B) closed system
(C) both open and closed system exists
(D) none of the above
77. technique is used for planning the procurement of dependent demand items.
- (A) MRP (B) EOQ
(C) CPM (D) PERT
78. The North West Corner rule :
- (A) is used to find an initial feasible solution
(B) is used to find an optimal solution
(C) is based on the concept of minimizing opportunity cost
(D) none of the above

79. A car moving with a uniform acceleration covers 450 m in 5 secs interval, and covers 700 m in next 5 seconds interval. The acceleration of the car is :

(A) 7.5 m/sec^2

(B) 10 m/sec^2

(C) 12.5 m/sec^2

(D) 20 m/sec^2

80. For principal axes, the moment of inertia will be :

(A) $I_{xy} = 0$

(B) $I_{xy} = 1$

(C) $I_{xy} = \infty$

(D) None of these

81. If the algebraic sum of the virtual work for every displacement is, the system is in equilibrium.

(A) zero

(B) one

(C) infinity

(D) none of these

82. Volume of 1 kg of dry steam is known as :

(A) total volume

(B) saturated volume

(C) specific volume

(D) none of these

83. The second law of thermodynamics defines :
- (A) internal energy (B) heat
(C) work (D) entropy
84. Section modulus (Z) of a beam depends on :
- (A) the geometry of the cross-section
(B) weight of the beam
(C) only on length of the beam
(D) none of the above
85. In a lower pair of links there is contact.
- (A) point (B) line
(C) surface (D) no
86. LVDT is used for measuring :
- (A) displacement (B) roughness
(C) pressure (D) speed
87. GO-NO GO gauges are used for inspection of :
- (A) variables (B) attributes
(C) both variables and attributes (D) none of these

88. is a cylindrical rod threaded at both the ends and left plain in the middle.
- (A) Shaft (B) Spindle
(C) Stud (D) Bolt
89. If a circular chamber is introduced between the casing and the impeller, then casing is known as :
- (A) guide blades casing (B) vortex casing
(C) volute casing (D) none of these
90. The layout with a higher material handling effort is a layout.
- (A) process (B) product
(C) equipment (D) material
91. represents the area under acceleration-time graph.
- (A) Acceleration (B) Displacement
(C) Motion (D) Change in velocity
92. McLeod gauges are used for measuring :
- (A) RPM of shaft (B) Surface roughness
(C) Vacuum (D) Velocity

93. When the shafts are slightly misaligned then most suitable coupling to connect them is :
- (A) Rigid coupling (B) Flexible coupling
(C) Oldham coupling (D) None of these
94. Which among the following is the boiler mounting ?
- (A) Blow off cock (B) Feed pump
(C) Economiser (D) Superheater
95. The most commonly used criteria for measuring forecast error is :
- (A) mean absolute deviation
(B) mean absolute deviation percentage error
(C) mean standard deviation error
(D) mean square error
96. Gibbs phase rule for general system is :
- (A) $P + F = C - 3$ (B) $P + F = C + 3$
(C) $P + F = C - 2$ (D) $P + F = C + 2$

97. Principal plane and plane containing maximum shear stress are separated by :
- (A) 0° (B) 30°
(C) 45° (D) 60°
98. sensor is an example for proximity sensor used in Robots.
- (A) Micro switch (B) Ultrasonic
(C) Touch and tactile (D) None of these
99. On principal plane the shear stress is
- (A) zero
(B) unity
(C) double the value of principal stress
(D) half the value of principal stress
100. Lami's theorem can be applied for :
- (A) 3 concurrent forces (B) 3 non-concurrent forces
(C) 3 parallel forces (D) 3 collinear forces