

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO****TEST BOOKLET SERIES**

**TEST BOOKLET**  
**A.E.(MECH-PW)-2016**

**B**

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 :  

A   B      D
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 gives 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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P.T.O.

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[Maximum Marks : 100

1. When a force acting on the curved surfaces, ..... force equals the force on the projected area of the curved surface and acts at the centre of pressure of the projected area.  
  
(A) Vertical  
(B) Horizontal  
(C) Only 30 degree inclined  
(D) None of the above
2. .... is an example for rotary displacement pump.  
  
(A) Slider pump (B) Piston pump  
(C) Lobe pump (D) Quadra pump
3. In ..... welding, the joint to be welded is filled with a stick electrode which is kept in place by means of a glass fibre tape or copper retaining bar.  
  
(A) Stud (B) Plasma arc  
(C) Atomic hydrogen (D) Fire cracker

4. Hooke's joint can be used for connecting two :
- (A) Non-parallel and non-intersecting shafts
  - (B) Parallel and non-intersecting shafts
  - (C) Parallel and intersecting shafts
  - (D) Non-parallel and intersecting shafts
5. According to principle of virtual work, 'the work done during virtual displacement from the equilibrium is equal to .....'.
- (A) Unity
  - (B) Infinity
  - (C) Zero
  - (D) Negative value
6. .... is a measure of effectiveness of the vibration isolating material used in foundation upon which the machines are installed.
- (A) Absorptivity
  - (B) Emissivity
  - (C) Reactivity
  - (D) Transmissibility
7. The ratio of 'actual radiation at T to black surface radiation at T' is known as :
- (A) Radiance
  - (B) Emittance
  - (C) Convectness
  - (D) Irradiance



8. A fuel cell transforms chemical energy into electrical energy through a series of ..... reactions.
- (A) Catalyst-aided oxygen-reduction
  - (B) Catalyst-absent oxidation
  - (C) Catalyst-aided hydrogen-reduction
  - (D) None of the above
9. .... is an example for thermosetting resins.
- (A) PVC
  - (B) ABS
  - (C) Methacrylate
  - (D) Phenol-formaldehyde
10. Unit of moment of area is :
- (A)  $m^2$
  - (B)  $m^3$
  - (C)  $m^4$
  - (D)  $kg\cdot m^2$
11. R-P-Y motion can be provided in an industrial robot for ..... motion.
- (A) Arm
  - (B) Body
  - (C) End effector
  - (D) None of these

12. For solving 'n' jobs and two machines scheduling problem ..... algorithm can be used.

(A) Parkinson's

(B) Baker's

(C) Taylor's

(D) Johnson's

13. In a general plane motion, if a body is rolling without slipping on stationary surface then the point of contact with stationary surface is the .....

(A) Axis of rotation

(B) Instantaneous centre of rotation

(C) Centroidal axis of rotation

(D) Point of inflexion

14. While solving linear programming problems, changes in the right hand side constants of constraints is made as one of the ways of making .....

(A) Constraint analysis

(B) Function analysis

(C) Sensitivity analysis

(D) Objective function analysis

15. .... generally refers to the stress required to rupture the sand specimen under compressive loading.

(A) Refractoriness

(B) Green strength

(C) Shear stress

(D) Rigidity

16. .... micrometer consists of two micrometer heads installed in parallel in one frame and can be adjusted to go and not go dimensions of the gauge.

(A) Disc type

(B) Limit

(C) Point

(D) Screw thread

17. The point at which the line of action of buoyant force meets the centroidal axis of the body, when disturbed, is defined as .....

(A) COG

(B) Instantaneous centre

(C) Metacentre

(D) Point of inflexion

18. The ..... in progressive dies are used in order to bring the stock into the correct position for the succeeding blanking or piercing operation.
- (A) Plunger (B) Pilot  
(C) Stack pin (D) Piston
19. In ..... resistance welding the heat required for melting is obtained by means of an arc rather than simple resistance heating.
- (A) Upset (B) Flash  
(C) Seam (D) Projection
20. A wedge used to raise loads consists of ..... pairs.
- (A) One sliding (B) Two sliding  
(C) Three sliding (D) Revolving
21. If a triangular plane is parallel to vertical plane and perpendicular to horizontal plane, then in the top view (in first angle projection) it looks like .....
- (A) Triangle (B) Horizontal line  
(C) Vertical line (D) Inclined line

22. The ..... corollary of the ..... law of thermodynamics, that energy is conserved, is the application of the conservation of energy to closed systems.
- (A) first, second (B) second, first  
(C) first, first (D) second, second
23. The term ..... is used to specify what portion of the total energy transfer across a rotor is related to changes of static pressure (enthalpy) across the rotor.
- (A) Degree of freedom (B) Degree of transfer  
(C) Degree of conversion (D) Degree of reaction
24. To determine the relative humidity of an air-water vapor mixture, a psychrometer uses ..... thermometer(s).
- (A) one (B) two  
(C) three (D) zero
25. "Nishiyama Process" is a process comes under :
- (A) Metal cutting  
(B) Foundry  
(C) Non-conventional machining  
(D) Plastic fabrication



26. Maximum shear stress is given by :

(A)  $(\text{Max. Principal Stress} - \text{Min. Principal Stress}) / 2$

(B)  $(\text{Min. Principal Stress} + \text{Max. Principal Stress}) / 2$

(C)  $(\text{Normal Stress} + \text{Min. Principal Stress}) / 2$

(D)  $(\text{Max. Torsional Stress} - \text{Min. Principal Stress}) / 2$

27. Coolant ON/OFF can be executed in a CNC machine using :

(A) G-code

(B) M-code

(C) N-code

(D) C-code

28. The ratio of dynamic response of a structure to the static response (for the same load) is known as .....

(A) Impact factor

(B) Response factor

(C) Load factor

(D) Sensitive factor

29. While dealing with kinetics of particles, the forces in which the work is dependent upon the path followed by the particles is known as :
- (A) Conservative forces                      (B) Non-conservative forces  
(C) Coplanar forces                      (D) Non-collinear forces
30. In Vicker's hardness test, a square base pyramid diamond indenter having ..... between the opposite faces is used.
- (A)  $90^\circ$                       (B)  $105^\circ$   
(C)  $152^\circ$                       (D)  $136^\circ$
31. The compression failure of the skin of the mould cavity because of the excessive heat in the molten metal causes ..... .
- (A) Run out                      (B) Drop  
(C) Rat tail                      (D) Swell
32. The optical instrument used for the measurement of small angular differences, changes or deflection, plane surface inspection etc. is ..... .
- (A) Auto-collimator  
(B) Optical transfer calipers  
(C) Johansson Mikrokator  
(D) Sine bar

33. .... lines provide an instantaneous picture of the particles, which have passed through a given point like the injection point of a dye in a flow.

(A) Stream

(B) Path

(C) Time

(D) Streak

34. In an arc welding ..... is the depression in the weld metal pool at the point where the arc strikes the base metal plate.

(A) Root

(B) Puddle

(C) Crater

(D) Flank

35. Defect in welding where a long and continuous visual separation line between the base metal and HAZ is :

(A) Lamellar tearing

(B) Hot cracking

(C) Undercut

(D) Porosity

36. Front view of an object lies in .....
- (A) Horizontal Plane (HP)
  - (B) Vertical Plane (VP)
  - (C) Profile Plane (PP)
  - (D) Inclined Plane (IP)
37. A variation in the ..... force (effort) of an engine is caused by the unbalanced portion of the primary force which acts along the line of stroke of a locomotive engine.
- (A) Shear
  - (B) Reactive
  - (C) Tensile
  - (D) Tractive
38. The mass of vapor in the system divided by the total system mass (the mass of vapor plus the mass of liquid) is defined as :
- (A) Quantity
  - (B) Quality
  - (C) Mass mix ratio
  - (D) Vapor mix ratio



39. The purpose of 'diffuser' is opposite to that of :

(A) Compressor

(B) Nozzle

(C) Valve

(D) Condenser

40. "The total volume of a mixture of gases is equal to the sum of volumes that would be occupied by each component at the mixture temperature  $T$  and pressure  $P$ " is :

(A) Dalton's Law

(B) Avogadro's Law

(C) Charles' Law

(D) Amagat's Law

41. .... is an example for foundation bolt.

(A) Plow bolt

(B) Lag bolt

(C) Rag bolt

(D) Stove bolt

42. At point of contra-flexure :

- (A) Shear force is zero
- (B) Bending moment is maximum
- (C) Shear stress is maximum
- (D) Bending moment is zero

43. The front hanging portion of the carriage of a lathe is known as :

- (A) Lead screw
- (B) Saddle
- (C) Tool post
- (D) Apron

44. The critical load for an ideal elastic column is often called the .....  
load.

- (A) Gordan
- (B) Rankine
- (C) Shanley
- (D) Euler

45. The value of coefficient of restitution lies between zero and one, when the impact is :

- (A) Perfectly elastic
- (B) Perfectly plastic
- (C) Semi-elastic
- (D) None of the above

46. Phosphorus in small amount ..... the strength and hardness of steels.

- (A) Increases
- (B) Decreases
- (C) Makes no change in
- (D) None of these

47. The principal breakdown pass sequences in rolling are :

- (A) box pass series, diamond-square series, oval-square series
- (B) round pass series, hexagon-square series, oval-round series
- (C) triangle pass series, pentagon-round series, tube-rod series
- (D) None of the above

48. The stylus probe instrument used for surface finish is :
- (A) Clinometer
  - (B) Profilometer
  - (C) Differential comparator
  - (D) None of the above
49. Draft tube ..... the available head in the case of reaction turbines.
- (A) Increases
  - (B) Decreases
  - (C) Maintains constant
  - (D) None of these
50. As per IS : 815-1966 for a coated electrode with designation "E 3 2 5 411 P", the designation "411" refers to :
- (A) Type of covering
  - (B) Strength and temperature related information
  - (C) Welding position
  - (D) Extrusion related



51. Degrees of freedom (d.o.f.) of a pair is the number of independent relative motions, both translational and rotational and thus a kinematic pair can have :

- (A) d.o.f. = 3 — no. of restraints
- (B) d.o.f. = 6 — no. of restraints
- (C) d.o.f. = 12 — no. of restraints
- (D) d.o.f. = no. of restraints

52. .... is the distance travelled by a point on either pitch circle of the two wheels during the period of contact of a pair of gear teeth.

- (A) Path of contact
- (B) Line of contact
- (C) Arc of contact
- (D) Radius of contact

53. .... governor is also known as Radial-Spring Governor.

- (A) Inertia
- (B) Wilson-Hartnell
- (C) Proell
- (D) Watt

54. .... equation of state for a gas is an improvement of the ideal-gas law.
- (A) Beattie-Bridgeman                      (B) Dalton
- (C) Clausius                                      (D) van der Waals
55. Wankel engine operates by transferring ..... motion.
- (A) Rotary                                      (B) Translation
- (C) Eccentric                                      (D) Linear
56. Heating medium carbon steel by means of an alternating magnetic field to a temperature within or above the transformation range followed by quenching is known as :
- (A) Case hardening
- (B) Carbonitriding
- (C) Induction hardening
- (D) Carburizing

57. To secure a leakless or fluid tight joint, a process known as ..... is employed during riveting.

- (A) Blocking
- (B) Calking
- (C) Crowning
- (D) Clinch forming

58. For BCC structure the representation of slip plane is given by :

- (A) (111)
- (B) (110)
- (C) (011)
- (D) (101)

59. 'Transferred arc' process comes in .....

- (A) USM
- (B) LBM
- (C) PAM
- (D) EDM

60. In electric resistance welding, the electrodes are made of ..... material.

- (A) Zn
- (B) Bronze
- (C) Cu
- (D) Fe

61. Who was the first European to draw attention to royal vansavalis of the Hill States ?

(A) William Moorcraft

(B) Francois Bernier

(C) William Finch

(D) Thomas Coryat

62. In which of the following princely hill states were copper-plate grants of the pre-Muhammadan period found ?

(A) Kangra

(B) Kullu

(C) Chamba

(D) Sirmaur

63. Rana of which princely state received the title of Raja around 1857 AD ?

(A) Keonthal

(B) Jubbal

(C) Bushahr

(D) Kehlur

64. At which place in Shimla District is Dome Devata temple ?

(A) Nirath

(B) Sharmala

(C) Sarahan

(D) Bachhonchh



65. Which mountain pass joins Lahul and Ladakh ?

(A) Kangla

(B) Kugti

(C) Baralacha

(D) Jalsu

66. Which District of H.P. is Sareul lake ?

(A) Chamba

(B) Kullu

(C) Mandi

(D) Kinnaur

67. In which district of H.P. is Nargu Sanctuary ?

(A) Kullu

(B) Mandi

(C) Kinnaur

(D) Shimla

68. Which of the following hydro-power project is in private sector ?

(A) Jogini

(B) Nanti

(C) Kurmi

(D) All of these

69. Which of the following was the first princely state to pass Panchayati Raj Act ?

(A) Bilaspur

(B) Mandi

(C) Sirmaur

(D) Bushahr

70. According to 2015-16 Economic Survey what has been the contribution of Industries to the GDP in H.P. during 2014-15 ?

(A) 16.48 percent

(B) 20.63 percent

(C) 22.09 percent

(D) 24.81 percent

71. When was Prime Minister's Jan Dhan Yojna launched ?

(A) August 2014

(B) September 2014

(C) October 2014

(D) None of the above

72. What was the venue of Simhastha Kumbh, 2016 ?

(A) Haridwar

(B) Prayag

(C) Ujjain

(D) Puri

73. To which political party does Pinayari Vijayan, who was sworn in as Chief Minister of Kerala in May 2016 belong ?

(A) CPI

(B) CPIM

(C) CPIML

(D) Congress

74. With which dance form is Soni Chaurasia associated ?

(A) Bharatanatyam

(B) Odissi

(C) Kathak

(D) Kuchipudi

75. Around how many seats did the TMC win in West Bengal during the 2016 Vidhan Sabha elections ?

(A) 185

(B) 211

(C) 221

(D) 231

76. Who is the President of Taiwan ?

- (A) Tsai Ing-Wen
- (B) Leung Chun-Ying
- (C) Truong Tan Sang
- (D) None of the above

77. Name of which of the following appeared in Panama Papers ?

- (A) David Cameron
- (B) Amitabh Bachchan
- (C) Vladimir Putin
- (D) All of the above

78. Who sent the first Instagram from International space station in April 2014 ?

- (A) Ray Tomlison
- (B) Steve Swanson
- (C) Paul Theroux
- (D) Kate Hamer



79. Which European City was flooded by the Seine river in early June 2016 ?

(A) Paris

(B) London

(C) Rome

(D) Brussels

80. Which country has more castles per square kilometre than any other country in the world ?

(A) Italy

(B) France

(C) Belgium

(D) Austria

81. .... of a body is defined as the distance from the reference axis at which the given area is assumed to be compressed and kept as thin strip, such that there is no change in its moment of inertia.

(A) Neutral axis

(B) Gyroscopic distance

(C) Second moment of area

(D) Radius of Gyration

82. Assignment problems can be solved by using :

- (A) Branch-and-bound algorithm
- (B) Control based algorithm
- (C) Non-linear simplex algorithm
- (D) Stochastic algorithm

83. .... are used to support cores inside the mould cavity to take care of its own weight and overcome the metallostatic forces.

- (A) Sprue
- (B) Chill
- (C) Chaplet
- (D) Striker

84. .... is a mechanical deformation technique of reducing or shaping the cross-section of rods or tubes by means of repeated impacts or blows.

- (A) Rolling
- (B) Drawing
- (C) Stamping
- (D) Swaging

85. The idea about the actual shape of the workpiece can be obtained by plotting the ..... graph.

(A) Sequential

(B) Logarithmic incremental

(C) Polar

(D) Cartesian

86. While dealing with flow in open channels one of the equations used is .....

(A) Sterling's equation

(B) Wilson's equation

(C) Tchebychev's equation

(D) Bazin's equation

87. The predominant problem faced with DC arc is the ....., the deflection of the arc by means of the magnetic field setup due to the flow of the welding current.

(A) arc pit

(B) spatter

(C) arc blow

(D) pinch spot

88. The velocity of an intermediate point on any of the links can be found by dividing the corresponding ..... vector in the same ratio as the point divides the link.
- (A) Position (B) Direction  
(C) Acceleration (D) Velocity
89. When a pinion and cutting rack are in mesh and due to interference the material removed from pinion is known as :
- (A) undercutting (B) backlash  
(C) arc cutting (D) traction
90. When the axes of the rolling of the ship and of the rotor are ....., there is no precession of the axis of spin and thus there will be no gyroscopic effect.
- (A) Parallel (B) Perpendicular  
(C) Inclined (D) None of these

91. A piston-cylinder containing air expands at a pressure of 150 kPa from a temperature of 285°K to a temperature of 550°K. The mass of air is 0.05 kg and  $C_V = 0.7176$ . Then the change in internal energy will be :

(A) 13.31 kJ

(B) 3.8 kJ

(C) 9.51 kJ

(D) 1.23 kJ

92. Cut-off ratio which is used to describe the diesel engine performance is defined as :

(A) Volume at the start of heat addition/volume at the end of heat addition

(B) Pressure at the start of heat addition/Pressure at the end of heat addition

(C) Volume at the end of heat addition/volume at the start of heat addition

(D) Pressure at the end of heat addition/pressure at the start of heat addition

93. 'Gliding Metal' covers a range from .....

(A) 5% to 15% Zn (balance Cu)

(B) 15% to 35% Cu (balance Zn)

(C) 2% to 4% Al (balance Zn)

(D) 1% to 2.5% Cu (balance Ph)



94. 'Hardie' is a tool used in smithying and forging belongs to the tool category of .....
- (A) hammers (B) tongs
- (C) fullers (D) chisels
95. Compound indexing is used in milling machine for ..... operation.
- (A) turning (B) knurling
- (C) gear cutting (D) none of these
96. "Hungarian Method" used to solve ..... problems.
- (A) LPP (B) assignment
- (C) queuing theory (D) game theory
97. A motorist is travelling at 90 kmph, when he observes a traffic light 250 m ahead of him turns red. The traffic light is timed to stay for 12 secs. If the motorist wishes to pass the light without stopping, just as it turns green, then the speed of the motor as it passes the traffic light will be .....
- (A) 30 kmph (B) 45 kmph
- (C) 60 kmph (D) Zero

98. If the queue length appears very large a customer he/she may not join the queue. This property is known as ..... of customers.

(A) Jockeying

(B) Balking

(C) Reneging

(D) None of these

99. .... pattern is adopted for those castings where there are some portions which are structurally weak and if not supported properly are likely to break under the force of ramming.

(A) Skeleton

(B) Sweep

(C) Loose Piece

(D) Follow Board

100. The sheet metal operation in which metal is removed in small increments is known as :

(A) Trimming

(B) Shaving

(C) Nibbling

(D) Notching