

Assistant Prof. in Mechanical Engi.

APME/21

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO.

PRELIMINARY SCREENING

TEST BOOKLET

Mechanical Engineering

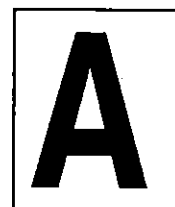
Time allowed : $1\frac{1}{2}$ hours

Full marks : 100

Answer *all* the questions.

Questions are of equal value.

TEST BOOKLET SERIES



Serial No. **0265**

Roll No.:

Signature of the Candidate:

INSTRUCTIONS

Candidates should read the following instructions carefully before answering the questions:

1. This booklet consists of 12 pages including this front page, containing 100 questions. **Verify the Page Nos. and Test Booklet series on each page and bring at once to the Invigilator's notice any discrepancy.**
2. Answers will have to be given in the OMR Sheet supplied for the purpose.
3. Before you proceed to mark in the OMR Sheet in response to various items in the Test Booklet, you have to fill in some particulars in the OMR Sheet. ***Do not fold the OMR Sheet as this will result in error in your marks.***
4. All questions are of multiple-choice answer-type. You will find *four* probable answers (A), (B), (C) and (D) against each question. Find out which of the four answers appears to you to be correct or the best. Now darken the circle corresponding to the letter of the selected answer in the OMR Sheet with **Black Ball Point Pen.**
5. One and only one circle is to be fully blackened for answer. Any spot in any other circle (multiple circle) or in wrong circle will be considered as wrong answer. If more than one circle is encoded for a particular answer, it will be treated as a wrong answer. Use of whitener is strictly prohibited.
6. ***There will be negative marking of $\frac{1}{3}$ mark for each wrong answer.***
7. ***There is a blank page at the end of this Booklet for Rough Work.***
8. ***The OMR Sheet should be handed over to the Invigilator before leaving the Examination Hall. You are permitted to take away the used Test Booklet after completion of the examination.***

1. In a Carnot cycle, heat is transferred at
- constant pressure
 - constant volume
 - constant temperature
 - constant enthalpy
2. Machining properties of steel are improved by adding
- sulphur, lead, phosphorous
 - silicon, aluminium, titanium
 - vanadium, aluminium
 - chromium, nickel
3. Morse test in multi-cylinder engines is used to determine
- air flow to engine.
 - mechanical efficiency.
 - indicated power.
 - volumetric efficiency.
4. Identify the part of the sentence that is grammatically incorrect:
She went to the gym despite of her illness.
- the
 - gym
 - of
 - her
5. Choose the correct option:
Our teacher teaches History _____ English.
- across
 - besides
 - beside
 - both
6. Bulk modulus K in terms of modulus of elasticity E and Poisson's ratio μ is given by
- $\frac{E}{3}(1+2\mu)$
 - $\frac{E}{3(1-2\mu)}$
 - $E(1-2\mu)$
 - $3E(1-2\mu)$
7. Coining is the operation of
- hot forging
 - cold forging
 - cold extrusion
 - piercing
8. The air-fuel ratio in petrol engines is controlled by
- governing
 - injection
 - controlling valve opening/closing
 - carburettion
9. The property of fluid by virtue of which it offers resistance to shear is called
- surface tension
 - adhesion
 - cohesion
 - viscosity
10. M.I. of a triangular section of base a and height h about an axis passing through its c.g and parallel to base is
- $\frac{ah^3}{8}$
 - $\frac{ah^3}{12}$
 - $\frac{ah^3}{36}$
 - $\frac{ah^3}{24}$

11. The most commonly used flame in gas welding is
- (A) oxidising
 - (B) neutral
 - (C) carburising
 - (D) All of the above
12. In d.c. machines, the armature windings are placed on the rotor because of the necessity for
- (A) development of torque
 - (B) communication
 - (C) electromechanical energy conversion
 - (D) generation of voltage
13. The speed of sound in an ideal gas varies directly as its
- (A) pressure
 - (B) density
 - (C) modulus of elasticity
 - (D) absolute temperature
14. A steam nozzle converts
- (A) kinetic energy into heat.
 - (B) heat energy into kinetic energy.
 - (C) heat energy into potential energy.
 - (D) heat energy into useful energy.
15. The power is transmitted by lead screw to the carriage through
- (A) gear box
 - (B) rack and pinion
 - (C) half nut
 - (D) worm and gear
16. Replace the underlined idiomatic expression proverb with correct alternative:
I stumbled upon some interesting old letters in my father's desk.
- (A) fell
 - (B) jumped
 - (C) surveyed
 - (D) discovered by chance
17. Entropy change depends on
- (A) mass transfer
 - (B) thermodynamic state
 - (C) change of temperature
 - (D) heat transfer
18. The fatigue life of a part can be improved by
- (A) electroplating
 - (B) shot peening
 - (C) polishing
 - (D) coating
19. A single phase transformer when supplied from 220 V, 50 Hz has eddy current loss of 50 W. If the transformer is connected to a voltage of 330 V, 50 Hz, eddy current loss will be
- (A) 168.75 W
 - (B) 112.5 W
 - (C) 75 W
 - (D) 50 W
20. The following material should be used for gears to run quietly at high speed:
- (A) Stainless steel
 - (B) Harder steel
 - (C) Non-metallic material
 - (D) Non-ferrous material

21. Moment of Inertia of a thin spherical shell is

- (A) Mr^2
- (B) $\frac{2}{3}Mr^2$
- (C) $\frac{2}{5}Mr^2$
- (D) $\frac{Mr^2}{2}$

22. Fill in the blank with correct option:

"Where's the _____ Post Office please?"

- (A) near
- (B) most near
- (C) more near
- (D) nearest

23. Ratio of inertia force to surface tension force is known as

- (A) Mach number
- (B) Froude number
- (C) Weber number
- (D) Reynolds number

24. A riveted joint may fail due to

- (A) shearing of the rivet.
- (B) tearing off the plate at an edge.
- (C) crushing of the rivet.
- (D) All of the above

25. Replace the underlined words with the correct option given below:

They thought that the young man would simply give up on the matter if he came to know that it would be a long legal case. Now they realise, they have caught a tartar!

- (A) an expert
- (B) dealing with a troublesome person
- (C) forced to leave
- (D) take risk

26. Where has India's First Moss Garden been inaugurated?

- (A) Kevadia, Gujarat
- (B) Nainital, Uttarakhand
- (C) Mandi, Himachal Pradesh
- (D) Subansiri, Arunachal Pradesh

27. Choose the synonym of the given word:

Parochial

- (A) Stagnant
- (B) Observer
- (C) Inability
- (D) Conservative

28. The armature MMF waveform of a d.c. machine is

- (A) Pulsating
- (B) Rectangular
- (C) Sinusoidal
- (D) Triangular

29. Stainless steel contains

- (A) chromium, iron and nickel.
- (B) chromium, nickel, iron and carbon.
- (C) chromium and nickel.
- (D) tungsten, vanadium and chromium.

30. In the case of cantilever, irrespective of the type of loading, the maximum bending moment and maximum shear force occur at

- (A) free end
- (B) middle
- (C) under the load
- (D) fixed end

31. In a polytropic process, heat rejected is given by

- (A) $\frac{\gamma}{\gamma-1} \times$ work done on the system.
- (B) $\frac{\gamma-n}{\gamma-1} \times$ work done on the system.
- (C) $\frac{\gamma-n}{\gamma} \times$ work done on the system.
- (D) $\frac{\gamma-n}{n} \times$ work done on the system.

32. Which of the following processes would remove least material?

- (A) Grinding
- (B) Lapping
- (C) Honing
- (D) Super finishing

33. Choose the synonym of the given word:

Abstract

- (A) Notional
- (B) Valuable
- (C) Attractive
- (D) Jewel

34. Find out which part of the sentence has an error. If there is no mistake, the answer is 'No error'.

- (A) Now that he is living alone in his house
- (B) he cooks twice a week
- (C) cleans thrice a week.
- (D) No error

35. Where has been India's first solar-based Integrated Multi-Village Water Supply Project (IMVWSP) inaugurated?

- (A) Gujarat
- (B) Assam
- (C) Sikkim
- (D) Arunachal Pradesh

36. Thermal power plant works on

- (A) Joule cycle
- (B) Brayton cycle
- (C) Otto cycle
- (D) Rankine cycle

37. Replace with correct tense forms of verbs given in bracket/s from the given options:

When Shyam reached the station, the train (leave).

- (A) left
- (B) had left
- (C) had had left
- (D) have left

38. Which is the first Indian documentary to win an Oscar award?

- (A) Stranger at the Gate
- (B) How do you Measure a Year?
- (C) The Elephant Whisperers
- (D) All that Breathes

39. Friction factor for pipes depends on

- (A) pipe roughness
- (B) fluid density
- (C) rate of flow
- (D) All of the Above

40. The path of contact in involute gears is

- (A) a straight line
- (B) cycloidal
- (C) circle
- (D) involute path

Please Turn Over

41. Fibrous fracture occurs in
(A) ductile material
(B) brittle material
(C) elastic material
(D) hard material
42. Name the first country to launch the world's first 6G satellite named "UESTC" satellite (Star Era-12) to test communications from space.
(A) China
(B) United States (US)
(C) Japan
(D) France
43. Octane number of iso-octane is about
(A) 50
(B) 80
(C) 90
(D) 100
44. An involute gear should have minimum of
(A) 8 teeth
(B) 12 teeth
(C) 16 teeth
(D) 20 teeth
45. Location of a surge tank in a hydroelectric power station is near
(A) reservoir
(B) tail race
(C) turbine
(D) dam
46. The Lai Haraoba festival is observed in
(A) Mizoram
(B) Sikkim
(C) Nagaland
(D) Manipur
47. Materials exhibiting time bound behaviour are known as
(A) Resilient
(B) Anelastic
(C) Visco elastic
(D) Isentropic
48. When was UN's International Day of Older Persons observed annually?
(A) October 2
(B) September 29
(C) October 1
(D) September 30
49. If D and T be the pitch circle diameter and number of teeth of a gear, then its circular pitch p is equal to
(A) $\frac{\pi T}{D}$
(B) $\frac{D}{T}$
(C) $\frac{\pi D}{T}$
(D) $\frac{\pi D}{2T}$
50. Engine pistons are usually made of aluminium alloy because it
(A) is lighter
(B) absorbs shocks
(C) is stronger
(D) wears less

51. Modulus of rigidity is defined as the ratio of
(A) linear stress to longitudinal strain.
(B) stress to volumetric strain.
(C) shear stress to shear strain.
(D) stress to longitudinal strain.
52. The unique property of cast iron is its high
(A) malleability
(B) ductility
(C) surface finish
(D) damping characteristics
53. In sand moulding, the bottom most part of the flask is called
(A) Drag
(B) Cope
(C) Cheek
(D) Flask bottom
54. Hot tear refers to
(A) process of heat treatment
(B) process of fabrication
(C) weathering of non-ferrous materials
(D) casting defect
55. The most widely used material for drill taps and reamers is
(A) high speed steel
(B) carbon steel
(C) low alloy carbon steel
(D) ceramic
56. Foundry crucible is made of
(A) german silver
(B) lead
(C) graphite
(D) cast iron
57. The following gauge is used for checking of holes:
(A) Plug gauge
(B) Snap gauge
(C) Dial gauge
(D) Ring gauge
58. The thermal efficiency of a diesel engine is of the order of
(A) 25%
(B) 34%
(C) 52%
(D) 68%
59. The machining method which uses abrasive slurry is known as
(A) electro-discharge machining
(B) plasma arc machining
(C) laser machining
(D) ultrasonic machining
60. A Bell Coleman Cycle is a reversed
(A) Carnot cycle
(B) Brayton cycle
(C) Joule cycle
(D) Otto cycle

Please Turn Over

61. The type of gear used for speed reduction of 50:1 will be

- (A) herring bone
- (B) spur
- (C) bevel
- (D) worm wheel

62. A two stroke engine is usually identified by

- (A) size of flywheel.
- (B) weight of engine.
- (C) absence of valves.
- (D) type of lubrication system.

63. The buoyancy depends on

- (A) mass of liquid displaced.
- (B) viscosity of the liquid.
- (C) depth of immersion.
- (D) pressure of the liquid displaced.

64. Choose the correct option:

The students in our school are _____ in other school.

- (A) as good as
- (B) good
- (C) bad
- (D) dance

65. A porter governor could be classified as

- (A) centrifugal type governor.
- (B) dead weight type governor.
- (C) inertia type governor.
- (D) pendulum type governor.

66. Which of the following is the binding material in cemented carbides?

- (A) nickel
- (B) cobalt
- (C) iron
- (D) vanadium

67. Change in enthalpy of a system is the heat supplied at

- (A) constant pressure
- (B) constant temperature
- (C) constant volume
- (D) constant entropy

68. The section modulus of a circular section about an axis through its c.g is

- (A) $\frac{\pi d^3}{8}$
- (B) $\frac{\pi d^3}{16}$
- (C) $\frac{\pi d^3}{32}$
- (D) $\frac{\pi d^3}{64}$

69. One word substitute of the given words 'one who possesses many talents' is

- (A) Versatile
- (B) Wisdom
- (C) Clever
- (D) Draw

70. A body moves from rest with a constant acceleration of 5 m/s^2 . The distance covered in 5 sec. is above

- (A) 38 m
- (B) 62.5 m
- (C) 96 m
- (D) 124 m

71. Steel is made from cast iron by removing all excess

- (A) carbon
- (B) sulphur
- (C) tungsten
- (D) oxygen

72. Fill in the blank with correct option:

"I don't like coffee." " _____ do it."

- (A) So
- (B) Neither
- (C) Either
- (D) No

73. Alcohol is used in manometers because

- (A) it has low vapour pressure.
- (B) it is clearly visible.
- (C) it can provide longer column due to low density.
- (D) it has low surface tension.

74. Carburising flame is used to weld metals like

- (A) steel
- (B) copper and brass
- (C) aluminium, stainless steel, zinc, diecastings, nickel etc
- (D) carburised steel

75. On which river is the Ratle Hydropower project located?

- (A) Beas
- (B) Ravi
- (C) Chenub
- (D) Sutlej

76. Diamond has

- (A) low heat conductivity.
- (B) high electrical conductivity.
- (C) high coefficient of friction against all metals.
- (D) lowest thermal expansion.

77. Choose the correct preposition:

Looking at the old photograph, he took a walk _____ the memory lane.

- (A) on
- (B) to
- (C) down
- (D) off

78. The maximum value of the pressure angle in case of cam is kept as

- (A) 10°
- (B) 14°
- (C) 20°
- (D) 30°

79. The delay period in petrol engine is the order of

- (A) 0.002 sec
- (B) 0.01 sec
- (C) 0.05 sec
- (D) 0.1 sec

80. Change the voice:

Who stole your cycle?

- (A) Your cycle was stolen by him?
- (B) The cycle was stolen.
- (C) By whom was your cycle stolen?
- (D) Did someone steal the cycle?

Please Turn Over

81. Replace the underlined idiomatic expression proverb with correct alternative:

The teachers were completely in the dark concerning the student's plans.

- (A) afraid
- (B) ignorant about
- (C) happy
- (D) sad

82. A 4 pole generator with 16 coils has a two layer lap windings. The pole pitch is

- (A) 32
- (B) 16
- (C) 8
- (D) 4

83. Strength of a beam is proportional to the square of its

- (A) depth
- (B) length
- (C) width
- (D) moment of inertia

84. Choose the correct option:

Please come _____ the classroom.

- (A) out of
- (B) over
- (C) on
- (D) in

85. Which Tiger Reserve received TX2 Tiger Conservation Awards 2020 for doubling the number of tigers in 4 years ahead of the target of 10 years?

- (A) Nagarjunsagar-Srisaïlam Tiger Reserve, Andhra Pradesh
- (B) Bor Tiger Reserve, Maharashtra
- (C) Amrabad Tiger Reserve, Hyderabad
- (D) Pilibhit Tiger Reserve, Uttar Pradesh

86. Grinding wheel is balanced frequently because of

- (A) random wear
- (B) uneven wear
- (C) frequent glazing
- (D) high rpm

87. The main purpose of performing open ckt on a transformer is to measure its

- (A) core loss
- (B) copper loss
- (C) total loss
- (D) insulation resistance

88. Change the voice:

Never disobey your elders.

- (A) You are ordered not to disobey your elders.
- (B) You are asked not to disobey your elders.
- (C) It is good to obey your parents.
- (D) You cannot disobey your parents.

89. Creep in belt drive is due to

- (A) material of the belt.
- (B) larger size of the driver pulley.
- (C) uneven extensions and contractions due to varying tension.
- (D) expansion of belt.

90. In the impulse turbine the steam expands

- (A) in the blades.
- (B) in the nozzle.
- (C) partly in the nozzles and partly in blades.
- (D) neither in nozzles nor in blades.

91. Where is the world's largest care and cure centre for elephants being set up in India?

- (A) Kerala
- (B) Meghalaya
- (C) Chhattisgarh
- (D) Odisha

92. Replace the underlined words with the correct option given below:

The owner of the house tried every trick in the book to sell the flat to my father, but failed.

- (A) ready to bargain
- (B) try every possible way
- (C) stop talking
- (D) judging someone

93. United Nations' (UN's) World Science Day for Peace and Development is observed on which date?

- (A) November 7
- (B) November 10
- (C) November 8
- (D) November 9

94. The stator winding of a single phase induction motor is splitted into two parts in order to

- (A) improve efficiency.
- (B) improve power factor.
- (C) develop starting torque.
- (D) increase speed.

95. The cutting edges of a standard twist drill are called

- (A) flutes
- (B) lips
- (C) wedges
- (D) flanks

96. The ratio of longitudinal stress to shear stress in thin walled cylinders is

- (A) $\frac{1}{2}$
- (B) $\frac{1}{4}$
- (C) 1
- (D) 2

97. Find out which part of the sentence has an error. If there is no mistake, the answer is 'No error'.

- (A) The road
- (B) to house
- (C) passes through a forest.
- (D) No error

98. Correct the given sentence grammatically:
Adesh, who he is my best friend, is a dancer.

- (A) Adesh, who is my best friend, is a dancer.
- (B) A dancer Adesh will be my friend.
- (C) Adesh who is my best friend who is a dancer.
- (D) My friend Adesh is reportedly a dancer.

99. The ratio of absolute viscosity to mass density is known as

- (A) Specific viscosity
- (B) Kinematic viscosity
- (C) Coefficient of viscosity
- (D) Viscosity index

100. Resilience of a material is considered when it is subjected to

- (A) shock loading
- (B) creep
- (C) fatigue
- (D) frequent heat treatment