



Application Number of the Candidate

Name of the Post: Junior Technician – Mechanical and Aerospace Engineering

Pay Level: 03

Date & Time of the Exam: 13 Dec 2023, 9.30 am

Duration: 01 hr. 30 min

Scheme of the Exam:

Topic	Number of Question	Marks
General English (Communication Skills)	20	40
General Arithmetic		
Reasoning		
Work Related Topics	30	60

Instructions to fill the responses in the OMR answer sheet:

1. Candidate must write his/her **application number** in the designated box on the top of OMR answer sheet.
2. Candidates must write the postcode and Question paper code in the designated boxes on the top of OMR answer sheet.
3. Candidates must sign in the box provided in the OMR answer sheet.
4. Each answer sheet must be signed by the invigilator in the space printed in the OMR answer sheet.
5. Only one response to be selected & marked. In case more than one response is marked for a single question or no response is marked for a question, no marks will be awarded for that question.
6. Partially filled circles shall not be considered as responses.
7. Erasing or changing of answer is not allowed.
8. No negative marking
9. Candidate must use Blue/Black ball point pen to fill his/her responses.
10. Rough work should not be done on the OMR answer sheet.
11. Candidates can use the designated page(s) of the question booklet for the purpose of rough work.

1	Fill in the blanks "After the treatment he was relieved _____ the pain"
A	with
B	for
C	of ✓
D	from

2	Fill in the blank" SP Balasubramaniam was _____ with a natural talent for music"
A	found
B	entrusted
C	given
D	endowed ✓

3	Find out which part of the sentence has an error, and choose that part as your answer out of (A), (B), (C), (D)If a sentence is free from error, then choose your answer as choice (D):- "He intend (A) / for going to the (B) / countryside this weekend.(C) / No error (D)"
A	A ✓
B	B
C	C
D	D

4	Find out which part of the sentence has an error, and choose that part as your answer out of (A), (B), (C), (D)If a sentence is free from error, then choose your answer as choice (D):- "The first inning (A) / of the match (B) / was very sensational. (C) / No error"
A	A ✓
B	B
C	C
D	D

5	Choose the word with the correct spelling
A	Receipt ✓
B	Reciept
C	Recept
D	Riceipt

6	Dimensions of kinetic energy is the same as that of
A	Force
B	Acceleration
C	Work ✓
D	Velocity

7	What is the unit of pressure?
A	Nm
B	Nm ²
C	Nm ⁻¹
D	Nm ⁻² ✓

8	The roots of $100x^2 - 20x + 1 = 0$ are:
A	1/20 and 1/20
B	1/10 and 1/10 ✓
C	1/10 and 1/20
D	None of the above

9	In ΔABC , right-angled at B, AB = 24 cm, BC = 7 cm. The value of tan C is:
A	12/7
B	24/7 ✓
C	20/7
D	7/24

10	If 10 men can do a piece of work in 12 days, the time taken by 12 men to do the same piece of work will be
A	8 days
B	9 days
C	12 days
D	10 days ✓

11	Half percent written as a decimal is
A	0.2
B	0.02
C	0.005 ✓
D	0.05

12	$(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ)$ is equal to:
A	0
B	$1 + 2\sqrt{3}$
C	$1 - \sqrt{3}$ ✓
D	$1 + \sqrt{3}$

13	If $f(x) = x \sin x$, then df/dx at $x = \pi/2$ is equal to
A	0
B	-1
C	1 ✓
D	1/2

14	$\int_1^2 dx/x^2$ equals to
A	1
B	-1
C	2
D	1/2 ✓

15	Identify the tense used in the following sentence: "I have been working on the problem"
A	Present continuous
B	Present perfect continuous ✓
C	Past perfect
D	Past continuous

16	Find the value of $\int \sin 2x \, dx$
A	$\cos 2x/2$
B	$\cos 2x$
C	$-\cos 2x/2$ ✓
D	$-\sin 2x/2$

17	The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ is a
A	Identity matrix
B	Symmetric matrix ✓
C	Skew symmetric matrix
D	None of the above

18	If $A = [a_{ij}]$ is a square matrix of order 2 such that $a_{ij} = 1$, when $i \neq j$ and $a_{ij} = 0$, when $i = j$, then A^2 is
A	$\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$
B	$\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$
C	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ ✓
D	$\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$


19	The total of the ages of Amar, Akbar and Antony is 80 years. What was the total of their ages 3 years ago?
A	71 years ✓
B	72 years
C	74 years
D	77 years

20	Given a semicircle with O as the centre, as shown in the figure, the ratio $(AC + CB)/ AB$ is
A	2
B	3
C	$\sqrt{2}$ ✓
D	$\sqrt{3}$

21	A particle is projected at 60 degree to the horizontal with a kinetic energy K. The kinetic energy at the highest point is:
A	K
B	Zero
C	$K/4$ ✓
D	$K/2$

22	Find the speed of uniform solid sphere after rolling down (without sliding) an inclined plane of vertical height $h=0.14\text{m}$ from rest is (Take $g = 9.8 \text{ m/s}^2$)
A	1.4 m/s ✓
B	1.2 m/s
C	1 m/s
D	1.3 m/s

23	A bucket filled with water weighing 20 kg is raised from a well of depth 20 m. If the linear density of the rope is 0.2 kg per meter. the amount of work done is:
A	4000 J
B	4040 J
C	4400 J ✓
D	4200 J

24	Which screw type is not shown below 
A	Hexagon head screw
B	Grub screw
C	Square head screw ✓
D	Socket head screw

25	The value of Young's modulus for Mild Steel is of the order of
A	$2.1 \times 10^5 \text{ MPa}$ ✓
B	$2.1 \times 10^6 \text{ MPa}$
C	$2.1 \times 10^7 \text{ MPa}$
D	$0.1 \times 10^6 \text{ MPa}$

26	What is the negative of the ratio of the strain in lateral dimension to the longitudinal strain?
A	Stress
B	Strain
C	Poisson's ratio ✓
D	Factor of safety

27	How much strain is developed in an iron rod of 10 metre length that gets elongated by 1 cm, if a force of 100 kg is applied at one end?
A	0.1
B	0.01
C	0.001 ✓
D	0.0001

28	Which of the following is the basic principle of fluid mechanics?
A	Momentum conservation
B	Mass conservation
C	Energy conservation
D	All of the above ✓

29	What is fluid dynamics?
A	Study of fluid behavior at rest
B	Study of fluid behavior at rest and motion
C	Study of fluid behavior at motion ✓
D	All of the above

30	When acceleration is _____, velocity of a particle is constant.
A	constant but non zero ✓
B	Zero
C	Minimum
D	Maximum

31	Which one of the following is true?
A	Pressure is a vector quantity
B	Streamwise speed is a vector quantity
C	Stress is a vector quantity
D	Temperature gradient is a vector quantity ✓


32	Which one of the following is the dimension of viscosity?
A	$[MLT^2]$
B	$[MLT^{-2}]$
C	$[ML^{-1}T^2]$
D	$[ML^{-1}T^{-1}]$ ✓

33	Why is a large reservoir used in single column manometer?
A	to enhance the change in level of liquid in reservoir
B	to negate the effects of change in level due to pressure variation ✓
C	to reduce the effect due to dynamic pressure variation due to motion
D	None of the above

34	What will the shape of the path line for a one-dimensional flow be like?
A	Straight line ✓
B	Parabolic
C	Hyperbolic
D	Elliptic

35	Pitot tube is to measure the _____
A	global pressure
B	total pressure ✓
C	static pressure
D	dynamic pressure

36	The distance moved by liquid will be more in which type of manometer?
A	inclined single column manometer ✓
B	vertical single column manometer
C	horizontal single column manometer
D	None of the above

37	What is the type of screw head?
	
A	Hexagon socket head cap screws
B	Hexagon head screws
C	Countersunk head screws ✓
D	Raised cheese hand screws

38	When two resistors of resistance R are connected in series, their effective resistance is
A	$R/2$
B	R
C	$3R/2$
D	$2R$ ✓

39	The property of a material that enables it to resist fracture due to high-impact loads is known as
A	Elasticity
B	Resilience
C	Endurance
D	Toughness ✓

40	What is viscous dissipation?
A	Loss of energy due to viscous effect ✓
B	Loss of potential energy due to viscous effect
C	Increase in kinetic energy due to change in temperature
D	Frictional drag

41	Which of the following is a typical composition of high speed steel?
A	18% Vanadium, 4% Chromium and 1% Tungsten
B	18% Chromium, 4% Tungsten and 1% Vanadium
C	18% Tungsten, 4% Vanadium and 1% Chromium
D	18% Tungsten, 4% Chromium and 1% Vanadium ✓

42	Knurling is a _____ operation.
A	Cutting
B	Rolling
C	Forming ✓
D	Turning

43	A hot wire anemometer is used to measure
A	Head of a flowing fluid
B	Temperature of a flowing fluid
C	Velocity of a flowing fluid ✓
D	Pressure of a flowing fluid

44	A component distorts after welding due to
A	Residual stresses ✓
B	Blow holes
C	Internal cracks
D	Internal cavities

45	Which of the following is expected to have the highest thermal conductivity?
A	Steam
B	Solid ice ✓
C	Water
D	Melting ice

46	The internal energy of system is a function of only
A	Pressure
B	Absolute temperature ✓
C	Volume
D	Mass

47	Which of the following physical quantity is dimensionless
A	Angle
B	Strain
C	Specific gravity
D	All of them ✓

48	The ultimate tensile strength and yield strength of most of the metals when temperature falls from 0°C to -150°C will
A	increase ✓
B	decrease
C	Remains the same
D	First increase and then decrease

49	What is the ratio between ultimate stress to working stress?
A	Bulk modulus
B	Young's modulus
C	Factor of safety ✓
D	Modulus of rigidity

50	Raindrops are spherical because of
A	Viscosity
B	Air resistance
C	Surface tension forces ✓
D	Atmospheric pressure