SENIOR LAB ASSISTANT (MECHANICAL)

PART-A

1. Identify the error (if any) in the sentence given below:
The call of the seas have always found an echo in me.
   A. The call of the seas
   B. have always found
   C. an echo in me
   D. No error

2. Ramesh has a meeting with Rohit at the same date.
   A. Ramesh has
   B. a meeting with Rohit
   C. at the same date
   D. No error

3. In the following question, pick out the most effective word from the given choices to fill in the blank to make the sentence meaningfully correct.
Irregular supply of electricity can ..... in wastage of electricity.
   A. cause B. affect C. effect D. result

4. In the following question, a sentence has been given in Active/Passive voice. Out of the four alternatives given, choose the one which best expresses the same sentence in Passive/Active voice.
I saw him leaving the house.
   A. He had been seen leaving the house.
   B. He was seen to be leaving the house.
   C. Leaving the house he was seen by me.
   D. He was seen leaving the house by me.

5. In the following question, a sentence has been given in Direct/Indirect Speech. Out of the four alternatives given, choose the one which best expresses the same sentence in Indirect/Direct Speech.
He said to her, "Don't read so fast."
   A. He told her not to read so fast.
   B. He advised her don't read so fast.
   C. He requested her not to read so fast.
   D. He ordered her not to read so fast.

6. Who was the founder of Nanda dynasty in Magadha?
A. Mahapadma Nanda B. Dhana Nanda C. Nandi Vardhan D. Mahanandin

7. The layer which is found below the crust of the earth is?
A. Trench B. Mantle C. Core D. Ridge

8. What does GNP stand for?
A. Gramin Nigam Limited
B. Gramin Nisak Product
C. Gross National Product
D. Grocery National Production

9. Where is the National Institute of Hydrology (NIH) located?
A. Roorkee B. Shimla C. Guwahati D. Chennai

10. Who is the first Asian man to be nominated for International Tennis Hall of Fame?
A. Leander Paes B. Mahesh Bhupathi C. Rohan Bopanna D. Yuki Bhambri

11. How many 3-digit numbers are there in between 100 and 300, having first and the last digit as 2?
A. 9 B. 10 C. 11 D. 12

12. A man's basis pay for a 40 hours' week is Rs. 200. Overtime is paid at 25% above the basic rate. In a certain week, he worked overtime and his total was Rs. 300. He, therefore, worked for a total of (in hours)?
A. 52 B. 56 C. 58 D. 62

13. Four years ago, the average age of A and B was 18 years. At present the average age of A, B and C is 24 years. What would be the age of C after 8 years.
A. 25 years B. 28 years C. 32 years D. 36 years

14. Raghav spends 80% of his income. If his income increases by 12% and the savings decrease by 10%, then what will be the percentage increase in his expenditure?
A. 20.5 B. 16 C. 17.5 D. 22

15. A carpenter is designing a table. The table will be in the form of a rectangle whose length is 4 feet more than its width. How long should the table be if the carpenter wants the area of the table to be 45 sq ft?
A. 6 ft B. 9 ft C. 11 ft D. 13 ft

16. In the following question, there is a certain relationship between two given words on one side of : : and one word is given on another side of : while another word is to be found from the given alternatives.
Milk : Emulsion : : Butter : ?
A. Aerosol B. Suspension C. Sol D. Gel

17. Select the number that can replace the question mark (?) in the following series.
87, 89, 92, 97, 104, 115, ?, 145
A. 125 B. 128 C. 133 D. 132

18. In the following question consist of two words each that have a certain relationship to each other, followed by four lettered pairs of words. Select the lettered pair that has the same relationship as the original pair of words printed in bold.
Termite : Wood
A. Neem : Cotton B. Fibre : Jute C. Thread : Cloth D. Moth : Wool

19. Unscramble the letters in the words given in this question and find the odd one out?
A. ULME B. RIGTE C. KYDENO D. LCEAM

20. Study the following alphabetical sequence and answer the question following it.
ABBCDEFEIBCAFECBBACAOBNUVW
Question: If all the vowels are dropped from the series, then which alphabet will be eighth from the left end?
A. C B. B C. N D. F

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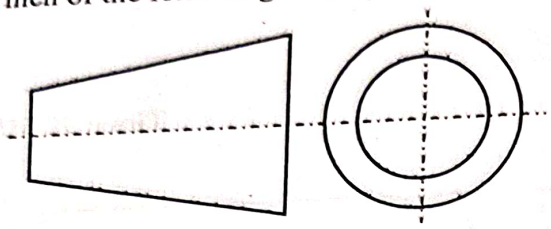
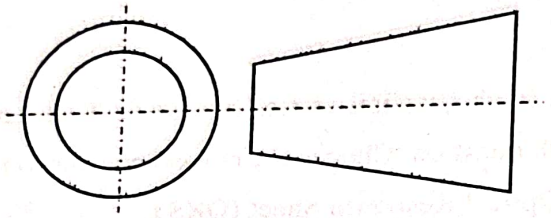
PART - B

1. Which of the following is the symbol for third angle system of projection.



(a)



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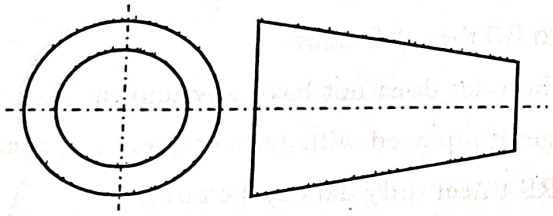

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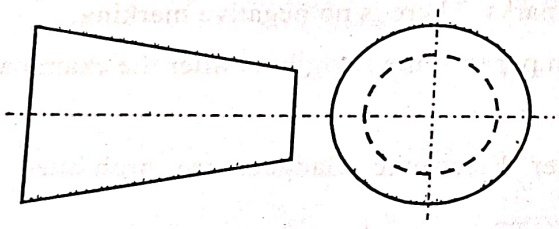


(d)

2. In a CNC program block

N10 G02 G91 X52 Z25 ....

G02 represents:

(a) linear interpolation

(b) clockwise circular interpolation

(c) incremental command

(d) absolute command

3. If the process of heat transfer is slow then it can be:

(a) conduction or convection

(b) conduction or radiation

(c) convection or radiation

(d) radiation only

4. For which of the following, the engineering drawing is drawn with a reduced scale.

(a) components of mother board panel of a cpu

(b) gearbox of wrist watch

(c) gearbox of heavy duty truck

(d) components of universal joint used in passenger cars

5. A cutting tool having tool signature as 10, 9, 6, 7, 8, 2 will have end relief angle

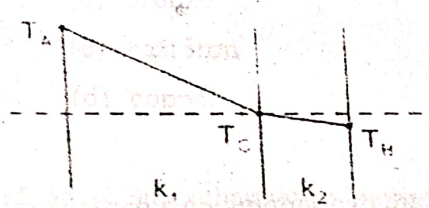
(a) 10°

(b) 9°

(c) 8°

(d) 6°

6. The temperature variation under steady heat conduction across a composite slab of two materials of conductivities K1 and K2 is shown in figure. Then which one of the following statement holds?



(a) $K_1 > K_2$

(b) $K_1 < K_2$

(c) $K_1 = K_2$

(d) $K_1 = 0$

7. In case of isometric projection, which of the following condition is true

(a) All the major axes (X, Y, Z) are 120° apart

(b) All planes are equally or proportionately shortened and tilted

(c) It's a drawing drawn on isometric axes with reduced scale

(d) All of these

8. Match the machine tools (Group A) with the probable operations (Group B):

Group A	Group B
P: Centre lathe	1: Slotting
Q: Milling	2: Counter boring
R: Grinding	3: Knurling
S: Drilling	4: Dressing

(a) P-1, Q-2, R-4, S-3

(b) P-2, Q-1, R-4, S-3

(c) P-3, Q-1, R-4, S-2

(d) P-3, Q-4, R-2, S-1

9. Grashof number signifies the ratio of

(a) inertia force to viscous force

(b) buoyancy force to viscous force

(c) buoyancy force to inertia force

(d) inertia force to surface tension force

10. If center line, hidden line, projection line and section line are overlapping on a particular orthographic projection, then which line should be drawn on the projection?

(a) Centre line

(b) Hidden line

(c) Projection line

(d) Section line

11. To achieve the required taper for a turning job with a workpiece length of 200 mm and a taper of 1:50, the necessary tailstock set over is

(a) 3 mm

(b) 2 mm

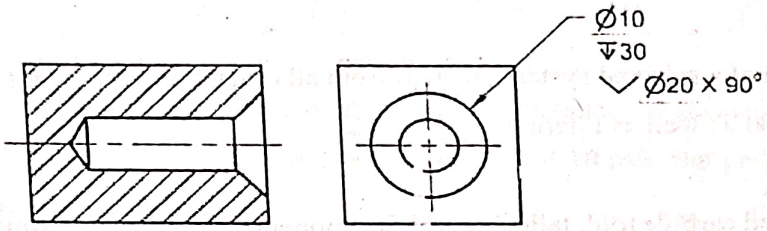
(c) 1 mm

(d) 4 mm

12. If the temperature of solid surface changes from 27°C to 327°C, then its emissive power changes in the ratio of

(a) 2
(b) 8
(c) 16
(d) 4

13. In the following drawing, what does dimension Φ10 represents?



(a) countersink diameter
(b) drill depth
(c) drill diameter
(d) countersink angle

14. Continuous chips can be produced during machining of

(a) brass
(b) bronze
(c) cast iron
(d) copper

15. In a heat exchanger, it is observed that $\Delta T_a = \Delta T_b$, where ΔT_a is the temperature difference between the two single phase fluid streams at one end and ΔT_b is the temperature difference at the other end. The heat exchanger is

(a) a condenser
(b) an evaporator
(c) a counter flow heat exchanger
(d) a parallel flow heat exchanger

16. Free body diagram is

(a) sketch of a selected system isolated from all other bodies.

(b) sketch of a selected system isolated from all other bodies showing only external forces.

(c) sketch of a selected system isolated from all other bodies showing only internal forces.

(d) sketch of a selected system isolated from all other bodies showing all the forces both external as well as internal.

17. For a cemented carbide tool, tailor's tool life exponent is 0.25. If the cutting speed is halved, the tool life will be increase by

(a) two times

(b) four times

(c) eight times

(d) sixteen times

18. A U-tube manometer measures

(a) absolute pressure at a point

(b) local atmospheric pressure

(c) difference in pressure between two points

(d) difference in total energy between two points

19. A train of weight 2000 kN is running on a horizontal track at a constant speed of 15 m/s, overcoming a constant frictional force of 20 kN. What is the power of the engine driving the train?

(a) 300 kW

(b) 3000 kW

(c) 1200 kW

(d) 400 kW

20. When machining parameters are kept constant, tool life will be less in

(a) down milling

(b) face milling

(c) up milling

(d) end milling

21. An object weighing 100 N in air was found to weigh 75 N when fully submerged in water. Then the relative density of object is

(a) 4

(b) 4.5

(c) 2.5

(d) 1.25

22. The motion of a particle is given by $s = 2t^2 + 3$, where distance s is measured in meters and time t is in seconds. Starting from t=0, to attain a velocity of 10 m/s, the particle will have to travel a distance of

(a) 5.5 m

(b) 10 m

(c) 12.5 m

(d) 15.5 m

23. The time taken to drill a hole of diameter 25 mm in a 30 mm thick steel plate with a feed of 1 mm/rev and the drill spindle speed being 60 rpm is _____minutes

(a) 0.25

(b) 0.50

(c) 0.35

(d) 0.65

24. Two reservoirs are connected by two pipes A and B of identical friction factor and length, in series. If the diameter of A is 30% larger than that of B the ratio of the head loss in A to that in B is

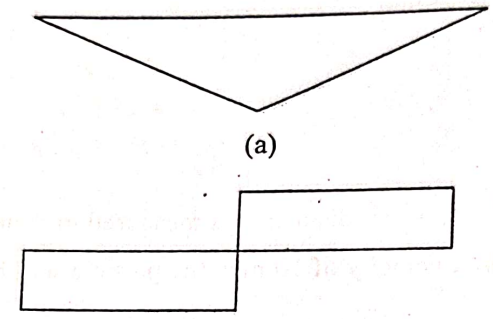
(a) 0.77

(b) 0.59

(c) 0.50

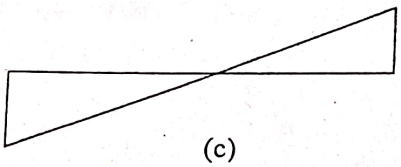
(d) 0.27

25. A beam is simply supported at its ends and is loaded by a couple at its mid-span. The shear force diagram for the beam is given by

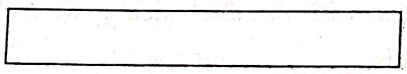


(a)

(b)



(c)



(d)

26. Out of the following cutting tools made of different materials, the hardest one which is next to diamond is_____.

(a) high speed steel
(b) ceramics
(c) cubic boron nitride
(d) cemented carbide

27. A draft tube is used in a reaction turbine to

(a) guide water downstream without splashing
(b) convert residual pressure energy into kinetic energy
(c) convert residual kinetic energy into pressure energy
(d) streamline the flow in the tailrace

28. A bolt of diameter 33 mm having safe tensile stress 100 MPa can safely carry a load of

(a) 80 kN

(b) 100 kN

(c) 120 kN

(d) 150 kN

29. Following are the reasons for high specific energy requirements in grinding compared to single point cutting tools

1. average rake angle is negative
2. average rake angle is positive
3. plowing consumes additional energy without contributing to chip removal
4. sliding consumes additional energy without contributing to chip removal

(a) 1, 3 and 4 only

(b) 2, 3 and 4 only

(c) 1 and 3 only

(d) 1 and 4 only

30. Water is to be lifted by a net head of 180 m. Identical pumps with specific speed of 30 and rotative speed of 1450 rpm and capable of discharging 200 L/s are available. The number of pumps required for the job are

(a) 1

(b) 2

(c) 3

(d) 4

31. Which of the following is true for engineering materials? (μ=Poisson's ratio)

(a) $0 < \mu < 0.5$

(b) $0 < \mu < \infty$

(c) $0 < \mu < 1$

(d) $-1 < \mu < 1$

32. Which of the following methods can be used for manufacturing two meter long seamless metallic tubes?

(a) drawing

(b) extrusion

(c) rolling

(d) extrusion and rolling

33. Higher efficiency during the regeneration process in "Rankine cycle" is because of
    (a) heat is added before steam enters the low pressure turbine
    (b) the average temperature of heat addition in the boiler increases
    (c) the total work delivered by the turbine increases
    (d) the pressure inside the boiler increases

34. A column, which can sustain lowest l uckling load, has
    (a) both ends hinged
    (b) both ends fixed
    (c) one end fixed other end hinged
    (d) one end free and other end fixed

35. The forging method used to reduce the cross sectional area is called _____.
    (a) upsetting
    (b) edging
    (c) fullering
    (d) heading

36. The work required to run an ideal compressor becomes minimal if compression follows
    (a) an adiabatic process
    (b) an isobaric process
    (c) an isothermal process
    (d) a polytrophic process

37. Select the correct statement
    (a) kinetic friction is less than maximum static friction
    (b) kinetic friction is more than maximum static friction
    (c) kinetic friction is equal to maximum static friction
    (d) impending sliding friction is more than the limiting friction

38. What is the major problem in hot extrusion?
    (a) design of punch

(b) design of die

(c) wear and tear of die

(d) wear of punch

39. A 4-stroke 4-cylinder engine has cylinder diameter of 4 cm, stroke length of 7 cm and clearance volume 2 cm^3. The engine capacity in cc is:

(a) 150

(b) 272

(c) 415

(d) 352

40. The engine of an aeroplane rotates in clockwise direction when seen from the tail end and the aeroplane takes a turn to the left. The effect of gyroscopic couple on the aeroplane will be

(a) to raise the nose and lower the tail

(b) to raise the nose and tail

(c) to lower the nose and raise the tail

(d) to lower the nose and tail

41. Which one of the following casing produces the products with a better surface finish?

(a) sand casting

(b) hot die casting

(c) investment casting

(d) cold die casting

42. Which of the following is a sensor that is able to detect object without any physical contact?

(a) Galvanometer

(b) Proximity sensor

(c) Thermocouple

(d) Ultrasonic sensor

43. with the decrease of governor speed

(a) radius of rotation decreases but height of governor increases

(b) radius of rotation and height of governor decreases

(c) radius of rotation and height of governor increases

(d) radius of rotation increases but height of governor decreases

44. The STL files translate the part geometry from a CAD system to_____.

(a) CNC machine

(b) CMM machine

(c) RP machine

(d) CAPP machine

45. Which of the following is a correct statement

(a) PI controller improves steady state response

(b) PD controller improves transient response

(c) PI controller improves steady state response and PD controller improves transient response

(d) All of these

46. In its simplest form, a cam follower mechanism consist of

(a) three links

(b) two links

(c) one links

(d) four links

47. In submerged arc welding, the arc is struck between:

(a) consumable coated electrode and work piece

(b) non-consumable electrode and work piece

(c) consumable bare electrode and work piece

(d) tungsten electrode and work piece

48. Which of the following methods is the strongest tool to determine the stability and the transient response of the system?

(a) Routh-Hurwitz criterion

(b) Root locus

(c) Bode plot

(d) Nyquist plot

49. If there are several unbalanced masses in a rotor in different planes, the minimum number of balancing masses required, is

(a) one
(b) two
(c) three
(d) four

50. Which type of transformer is used in arc welding?

(a) toroidal
(b) autotransformer
(c) step down
(d) step up

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