INDUS RANGERS DEFENCE ACADEMY

4TH Floor Shakumbhari Complex, Chetmani Near: IP Vijaya Mall Bhelupur Varanasi, (U.P.– 221010)

IMU – CET [WEEKLY TEST]

PRACTICE SHEET – 1

Time: 1:30 Hr **M. M.: 240 Marks**

General Instructions:

- There are 60 questions
- All questions have 4 marks for correct and –1 mark for wrong answer as a penalty.
- The name, date, and exam must be filled in OMR sheet otherwise the result will not be published.
- OMR fill should be properly.

[ENGLISH]

1. What would the correct pronoun be: "My name is Sonia. ___ love my family."?
   A. He B. I C. She D. We
2. What would the correct pronoun be: "On the left, you can see Simon. ___ is my brother."?
   A. That B. He C. It D. Him
3. What would the correct pronoun be: "I met Sonia yesterday. ___ made me laugh."?
   A. It B. Her C. She D. Them
4. What would the correct pronoun be: "_____ are not my keys."?
   A. We B. She C. He D. These
5. Which sentence correctly uses a possessive pronoun?
   A. The red notebook is my. B. The red notebook is mine.
   C. The red notebook is me. D. The red notebook is I.
6. What would the correct pronoun be: "My grandparents live in Mumbai. ___ visit us often."?
   A. Them B. They C. Their D. He
7. _____ has always trusted her boyfriend.
   A. I B. We C. She D. He
8. John is my friend. I gave ___ my books.
   A. Him B. It C. They D. His
9. What would the correct pronoun be: "Why have you not sent the report? ___ was your responsibility."?
   A. It B. Those C. Its D. Them
10. What would the correct pronoun be: "_____ need to work harder to make my dreams come true."?
    A. She B. I C. They D. These
11. What would the correct pronoun be: "Rohan said that _____ would not come tomorrow because he has soccer practice."?
    A. I B. Us C. He D. Him
12. Which sentence correctly uses a reflexive pronoun?
    A. She bought he a new book. B. She bought her a new book.
    C. She bought she a new book. D. She bought herself a new book.
13. What would the correct pronoun be: "Birds flap ___ wings."?
    A. It B. His C. Their D. Them
14. Identify the sentence that uses an indefinite pronoun correctly.
    A. Everyone are welcome to join the meeting.

B. Everyones is welcome to join the meeting.

C. Everyone is welcome to join the meeting.

D. Everyone be welcome to join the meeting.

15. If _____ had some more money, his mother would have gotten the new phone she wanted.

A. We B. You C. She D. He

16. She is a good painter. This painting is __.

A. Her B. Hers C. His D. Their

17. What would the correct pronoun be: "Look outside. ___ is my car parked over there! The gray one."?

A. This B. That C. Those D. Their

18. Which sentence correctly uses a demonstrative pronoun?

A. This book is I was looking for. B. That is the book I was looking for.

C. These is the book I was looking for. D. Those book is I was looking for.

19. Choose the correct sentence using a relative pronoun.

A. The student who won the award is my cousin.

B. The student whom won the award is my cousin.

C. The student which won the award is my cousin.

D. The student that he won the award is my cousin.

20. Our friend, ___ we invited to the party, arrived early.

A. Whose B. The C. Whom D. Them

[MATHEMATICS]

21. If $a_1, a_2, a_3, \dots, a_9$ are in G.P., then what is the value of the following determinant?

$$\begin{vmatrix} \ln a_1 & \ln a_2 & \ln a_3 \\ \ln a_4 & \ln a_5 & \ln a_6 \\ \ln a_7 & \ln a_8 & \ln a_9 \end{vmatrix}$$

A. 0 B. 1 C. 2 D. 4

22. If the determinant $\begin{vmatrix} x & 1 & 3 \\ 0 & 0 & 1 \\ 1 & x & 4 \end{vmatrix} = 0$, then what is x equal to?

A. – 2 or 2 B. – 3 or 3 C. – 1 or 1 D. 3 or 4

23. If $f(x) = \begin{vmatrix} 1 & x & x+1 \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & 2(x-1)(x-2) & x(x+1)(x-1) \end{vmatrix}$ then what is $f(-1) + f(0) + f(1)$ equal to?

A. 0 B. 1 C. 100 D. – 100

24. If $\begin{vmatrix} a & -b & a-b-c \\ -a & b & -a+b-c \\ -a & -b & -a-b+c \end{vmatrix} - kabc = 0 \ (a \neq 0, b \neq 0, c \neq 0)$ then what is the value of k?

A. – 4 B. – 2 C. 2 D. 4

25. If (a – b) (b – c) (c – a) = 2 and abc = 6, then what is the value of $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix}$?

A. 3 B. 12 C. 14 D. 15

Question (26 – 28): Consider the following for the next three (03) items that follow:

Let $A = \begin{pmatrix} 0 & sin^2\theta & cos^2\theta \\ cos^2\theta & 0 & sin^2\theta \\ sin^2\theta & cos^2\theta & 0 \end{pmatrix}$ and A = P + Q where P is symmetric matrix and Q is skew – symmetric matrix.

26. What is P equal to?

A. $\begin{pmatrix} 0 & 1/2 & 1/2 \\ 1/2 & 0 & 1/2 \\ 1/2 & 1/2 & 0 \end{pmatrix}$ B. $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$

C. $\cos 2\theta \begin{pmatrix} 0 & -1 & 1 \\ 1 & 0 & -1 \\ -1 & 1 & 0 \end{pmatrix}$ D. $\cos 2\theta \begin{pmatrix} 0 & -1/2 & 1/2 \\ 1/2 & 0 & -1/2 \\ -1/2 & 1/2 & 0 \end{pmatrix}$

27. What is Q equal to?

A. $\begin{pmatrix} 0 & 1/2 & 1/2 \\ 1/2 & 0 & 1/2 \\ 1/2 & 1/2 & 0 \end{pmatrix}$ B. $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$

C. $\cos 2\theta \begin{pmatrix} 0 & -1 & 1 \\ 1 & 0 & -1 \\ -1 & 1 & 0 \end{pmatrix}$ D. $\cos 2\theta \begin{pmatrix} 0 & -1/2 & 1/2 \\ 1/2 & 0 & -1/2 \\ -1/2 & 1/2 & 0 \end{pmatrix}$

28. What is the minimum value of determinant of A?

A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $\frac{3}{4}$ D. 1

29. What is the sum of the roots of the equation $\begin{vmatrix} 0 & x-a & x-b \\ 0 & 0 & x-c \\ x+b & x+c & 1 \end{vmatrix} = 0$?

A. $a + b + c$ B. $a - b + c$

C. $a + b - c$ D. $a - b - c$

30. If a, b, c are in A.P., then what is $\begin{vmatrix} x+1 & x+2 & x+3 \\ x+2 & x+3 & x+4 \\ x+a & x+b & x+3 \end{vmatrix}$ equal to?

A. – 1 B. 0 C. 1 D. 2

31. If $\begin{vmatrix} x^2+3x & x-1 & x+3 \\ x+1 & -2x & x-4 \\ x-3 & x+4 & 3x \end{vmatrix} = ax^4 + bx^3 + cx^2 + dx + e$, then what is the value of e?

A. –1 B. 0 C. 1 D. 2

Question (32 – 33): Consider the following for the next two (02) items that follow:

Let $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$

32. What is A(adj A) equal to?

A. $\begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/2 & 0 \\ 0 & 0 & 1/2 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

33. What is A^{-1} equal to?

A. $\begin{bmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 1/2 & -1/2 & 0 \\ -1 & 3/2 & -2 \\ -1 & 3/2 & -3/2 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -2 & 0 \\ -4 & 6 & -8 \\ -4 & 6 & -6 \end{bmatrix}$

D. $\begin{bmatrix} 1/5 & -1/5 & 0 \\ -2/5 & 3/5 & -2 \\ -2/5 & 3/5 & -3/5 \end{bmatrix}$

34. If $Z = \frac{1}{3}\begin{vmatrix} i & 2i & 1 \\ 2i & 3i & 2 \\ 3 & 1 & 3 \end{vmatrix} = x + iy\,; i = \sqrt{-1}$ then what is modulus of Z equal to?

A. 1 B. $\sqrt{2}$ C. 2 D. $\sqrt{3}$

35. If $\begin{vmatrix} 2 & 3+i & -1 \\ 3-i & 0 & i-1 \\ -1 & -1-i & 1 \end{vmatrix} = A + iB$ where $i = \sqrt{-1}$, then what is A + B equal to?

A. – 10 B. – 6 C. 0 D. 6

[REASONING]

36. The angle of elevation of the top of a building at a distance of 70 m from its foot on a horizontal plane is found to be 60°. Find the height of the building.

A. $70\sqrt{3}$m B. $60\sqrt{3}$m C. $50\sqrt{3}$m D. $70\sqrt{2}$m

37. What is the angle of elevation of the sun, when the shadow of a pole of height x m is $\frac{x}{\sqrt{3}}$m?

A. 30° B. 45° C. 60° D. 75°

38. A person standing at a distance looks at a building having a height of 1000 metres. The angle between the top of the building and the ground is 30°. At what approximate distance (in metres) is the person standing away from the building?

A. 1000 B. 936 C. 1732 D. 1542

39. The shadow of tower is $\sqrt{3}$ times its height. Then the angle of elevation of the top of the tower is:

A. 45° B. 30° C. 60° D. 90°

40. A kite is attached to a string. Find the length of the string (in m) when the height of the kite is 90 m and the string makes an angle of 30° with the ground.

A. 180 m B. $90\sqrt{3}$m C. 45 m D. $60\sqrt{3}$m

41. From a point P on a level ground, the angle of elevation of the top of the tower is 30°. If the distance of point P from the foot of the tower is 510 m, then 50% of the height of the tower (in m) is:

A. 85 B. $\frac{85\sqrt{3}}{3}$ C. $85\sqrt{3}$ D. $150\sqrt{3}$

42. A boy is standing near a pole which is 2.7 m high and the angle of elevation of the top of the pole from the pole is 30°. The distance of the boy from the pole is:

A. 4.42 m B. 4.53 m C. 4.68 m D. 4.63 m

43. At a certain time of a day a tree 5.4 m height casts a shadow of a 9 m. If pole casts a shadow of 13.5 m at the same time, the height of the pole is:

A. 8.1 m B. 9.9 m C. 7.2 m D. 6.3 m

44. The length of the shadow of a vertical pole on the ground is 24 m. If the angle of elevation of the sun at that time is θ, such that $\sin\theta = \frac{5}{13}$, then what is the height of the pole?

A. 8 m B. 10 m C. 12 m D. 18 m

45. A ladder attached to the wall makes an angle of 60° to the horizontal of the land. If the lower end of the ladder is 10 meters away from the wall, what will be the length of the ladder?

A. 20 m B. 40 m C. 17.3 m D. 34.6 m

46. The length of the shadow of a vertical pole on the ground is 36 m. If the angle of elevation of the sum at that time is θ, such that sec θ = $\frac{13}{12}$, then what is the height (in cm) of the pole?

A. 12 B. 18 C. 9 D. 15

47. From 125-metre-high tower, the angle of depression of a car is 45°. How far the car is from the tower?

A. 125 m B. 75 m C. 95 m D. 60 m

48. The angle of depression of a point situated at a distance of 70 m from the base of a tower is 60°. The height of tower is:

A. $35\sqrt{3}$m B. 70 m C. $\frac{70\sqrt{3}}{3}$m D. $70\sqrt{3}$m

49. Pintu is flying a kite with a 60 m long thread. If the angle of depression of Pintu from kite is 45°, the height of the kite above the ground is:

A. 60 m B. $60\sqrt{3}$m C. 30 m D. $30\sqrt{3}$m

50. A telegraph post gets broken at a point against storm and its top touches the ground at a distance 20 m from the base of the post making an angle 30° with the ground. What is the height of the post?

A. $\frac{40}{\sqrt{3}}$m B. $20\sqrt{3}$m C. $40\sqrt{3}$m D. 30 m

[PHYSICS]

51. If two bulbs whose resistances are in the ratio of 1 : 2 are connected in series, the power dissipated in them has the ratio of

A. 2 : 1 B. 1 : 4 C. 1 : 1 D. 1 : 2

52. Two bulbs of (40 W – 220 V) and (100 W – 200 V), then correct relation for their resistances is

A. $R_{40} < R_{100}$ B. $R_{40} > R_{100}$

C. $R_{40} = R_{100}$ D. No relation can be predicted.

53. Which of the following acts as circuit protection device?

A. Conductor B. Inductor C. Switch D. Fuse

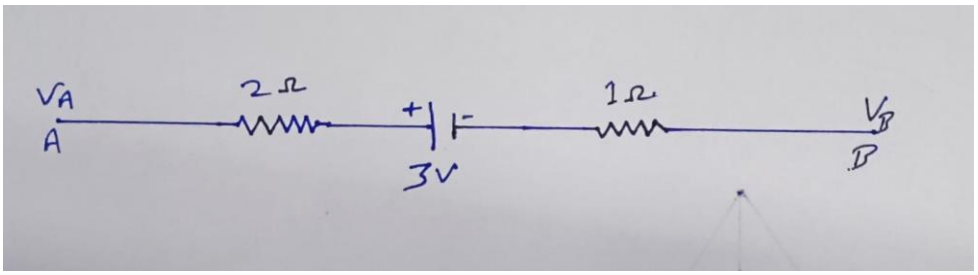
54. An electric kettle takes 4 A current at 220 V. How much time will it take to boil 1 kg of water from temperature 20°C? The temperature of boiling water is 100°C.

A. 4.2 min B. 6.3 min C. 8.4 min D. 12.6 min

55. A car battery of emf 12 V and internal resistance 5×10^{-2} Ω receives a current of 60 A from external source, then terminal voltage of battery is

A. 12 V B. 9 V C. 15 V D. 20 V

56. The potential difference $V_A - V_B$ between the point A and B in the given figure is



A. 6 V B. 9 V C. −3 V D. 3 V

57. Kirchhoff's First Law i.e., $\sum i = 0$ at a junction deal with the conservation of –

A. Momentum B. Energy

C. Angular velocity D. N.O.T

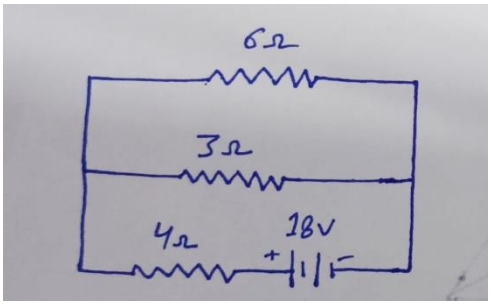
58. The total power dissipated in watts in the circuit shown here is

A. 40

B. 54

C. 4

D. 16



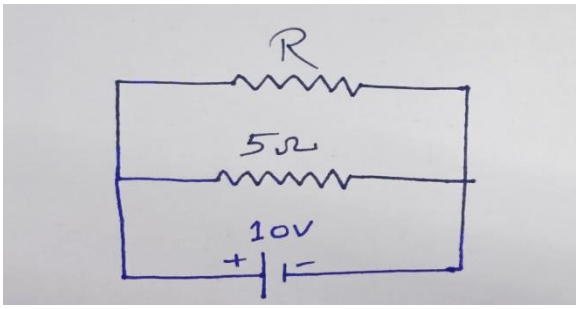
59. The power dissipated in the circuit shown in the figure is 30 watts, the value of R is

A. 20 Ω

B. 15 Ω

C. 10 Ω

D. 30 Ω



60. In the network shown in the figure, each of the resistance is equal 2 Ω. The resistance between the point A and B is

A. 3 Ω

B. 4 Ω

C. 1 Ω

D. 2 Ω

