

Sample Paper

Presently Studying in Class

10th (ENGINEERING)

IMPORTANT INSTRUCTIONS

1. Immediately fill the particulars on this page of the Test Booklet with *Blue/Black Ball Point Pen*. *Use of pencil is strictly prohibited.*
2. Duration of Test is 2 **Hours** and Question paper Contains **60 Questions**.
The **Max. Marks are 240**.
3. Student cannot use log tables and calculators or any other material in the examination hall.
4. Student must abide by the instructions issued during the examination, by the invigilators or the centre in charge.
5. Before attempting the question paper ensure that it contains all the pages and the no question is missing.
6. Each correct answer carries **4 marks**. There is **No Negative marking**.
7. A candidate has to write his / her answer in the **OMR** sheet by darkening the appropriate bubble with the help of **Blue / Black Ball Point Pen** only as the correct answer(s) of the question attempted.

This section contains 20 Multiple Choice Questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct

Directions : (Q.1 to Q.2) *In each of the questions below are given two statements and two conclusions numbered I and II. You have to take the given two statements to be true and then decide which of the given conclusions logically follows from the two given statements.*

1. **Statements :** Without rains the crops will not be good

: The crops were good

Conclusions : (I) There were rains

: (II) Crops were good due to good fertilizers

(A) Only conclusion I is true

(B) Only conclusion II is true

(C) Both conclusion I & II are true

(D) Neither conclusion I nor conclusion II is true

2. **Statements :** All poets are intelligent

: All singers are intelligent

Conclusions : (I) All singers are poet

: (II) Some intelligent persons are not signers

(A) Only conclusion I is true

(B) Only conclusion

(C) Both conclusions I and II are true

(D) Neither conclusion I nor conclusion II is true

3. A clock is set to show the correct time at 11 a.m. The clock gains 12 minutes in 12 hours what will be the true time when the watch indicates 1 p.m. on the 6th day?

(A) 10 a.m.

(B) 11 a.m.

(C) 12 noon

(D) None of these

Directions : (Q.4 to Q.5) : *In each of the following questions, arrange the given words in a meaningful sequence and then choose the most appropriate sequence from the alternatives provided below each question :*

4. 1.College 2.Child 3. Salary 4. School 5. Employment

(A) 1,2,4, 3, 5

(B) 2, 4, 1, 5, 3

(C) 4, 1, 3, 5, 2

(D) 5, 3, 2, 1, 4

5. 1.Travel 2.Destination 3. Payment 4.Berth/Seat number
- 5.Reservation 6.Availability of berth /seat for reservation
- (A) 1, 2, 5, 4, 3, 6 (B) 2, 6, 3, 5, 4, 1 (C) 5, 3, 4, 1, 6, 2 (D) 6, 2, 5, 4, 3, 1

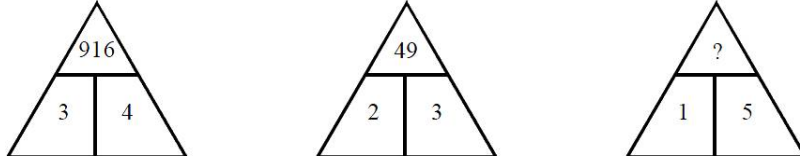
Directions : (Q.6 to Q.7) Find the missing letters :

6. ADCG , ? , JMLP , QTSW , UXWA
- (A) PSRV (B) PTSV (C) PRVS (D) PVRS
7. PQMN, NOKL, LMIJ, ? , HIEF
- (A) KLHI (B) MNJK (C) GHIJ (D) JKGH

Directions (Q.8 to Q.9) : Find the missing term:

8. $\begin{matrix} 9 \\ 36 \text{ } \textcircled{9} \text{ } 16 \\ 25 \end{matrix}$ $\begin{matrix} 49 \\ 100 \text{ } \textcircled{17} \text{ } 64 \\ 81 \end{matrix}$ $\begin{matrix} 4 \\ 25 \text{ } \textcircled{?} \text{ } 9 \\ 16 \end{matrix}$

- (A) 6 (B) 7 (C) 8 (D) 9

9. 

- (A) 125 (B) 215 (C) 251 (D) 512

10. There are deer and peacocks in a zoo. By counting heads they are 80. The number of their legs is 200. How many peacocks are there?

- (A) 20 (B) 30 (C) 50 (D) 60

11. If $D = 4$, and $COVER = 63$, then $BASIS = ?$

- (A) 49 (B) 50 (C) 54 (D) 55

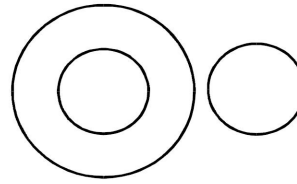
12. Which one of the following sets is best represented in the adjoining diagram?

(A) Animals, Insects, Cockroaches

(B) Country, States, Districts

(C) Animals, Males, Females and Hermaphrodites

(D) States, Districts, Union Territory



13. A is to the South-East of C, B is to the East of C and North-East of A. If D is to the North of A and North-West of B, in which direction of C is D located?

(A) North-West

(B) South-West

(C) North-East

(D) South-East

14. Find the missing term 4, 7, 10, 11, 22, 17, 46, 25, ?

(A) 58

(B) 69

(C) 86

(D) 94

15. Using the letters from the word SMARTPREP, how many meaning full english words can you form?

(A) Exactly 5

(B) Exactly 6

(C) Less than 6

(D) More than 6

16. If TRUTH is coded as SUQSTVSUGI, then the code for FALSE will be

(A) EGZBKMRDE

(B) EGZKMRTDF

(C) EGZBKMRTDF

(D) FGZBKNRTDF

17. If it was Saturday on 17th December, 2002 what was the day on 22nd December, 2004?

(A) Monday

(B) Tuesday

(C) Wednesday

(D) Sunday

18. If 7 spiders make 7 webs in 7 days, then how many days are needed for 1 spider to make 1 web?

(A) 1

(B) 7

(C) 3

(D) 14

19. A sample of bacteria, which doubles itself each second, is kept in a jar. At $t = 0$ some bacteria is put in the jar and after 1 hour the jar is observed to be full. At what time t was the jar half filled ?

(A) 30 min

(B) 45 min

(C) 20 min

(D) None of these

20. In a Class Vidhya ranks 7th from the top, Divya is 7 ranks ahead of Medha and 3 ranks behind Vidhya. Sushma who is 4th from the bottom, is 32 ranks behind Medha. How many students are there in the class

(A) 52

(B) 49

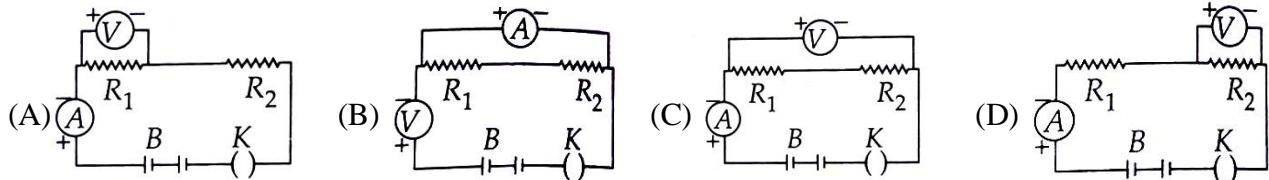
(C) 50

(D) 54

PHYSICS

This section contains 10 Multiple Choice Questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct

21. In an experiment to find equivalent resistance when two resistors in series, four students draw up circuits. Which one is correct?

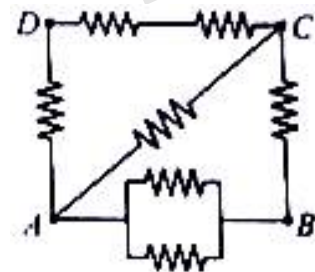


22. Alloys are commonly used in electrical heating devices, like electric iron etc. because

- (A) alloys have higher resistivity than that of its constituent metals
- (B) alloys do not burn at higher temperatures
- (C) alloys do not oxidise at higher temperatures
- (D) all of above.

23. Seven identical resistors of resistance R each are connected as shown in the given figure.

If R_1 , R_2 and R_3 are equivalent resistances between terminals A and B, between terminals C and D, and between terminals A and C respectively, then



- (A) $R_1 = R_2 > R_3$
- (B) $R_1 = R_2 < R_3$
- (C) $R_1 < R_2 > R_3$
- (D) $R_1 > R_2 < R_3$

24. Refractive index of a medium with respect to air is $\mu = \sqrt{2}$, find the critical angle between the two medium.

- (A) 30°
- (B) 90°
- (C) 45°
- (D) 60°

25. You are given n identical wires, each of resistance R . When these are connected in parallel, the equivalent resistance is X . When these will be connected in series, then the equivalent resistance will be :

- (A) X/n^2
- (B) n^2X
- (C) X/n
- (D) nX

26. A convex lens of focal length f produces a real image of size m -times the size of the object. Then the object distance is
- (A) $\left(\frac{m+1}{m}\right)f$ (B) $(m+1)f$ (C) $\left(\frac{m+1}{m}\right)$ (D) $\frac{fm}{(m+1)}$
27. Select the correct sequence of light entering the different parts of human eye
- (A) cornea, lens, iris, pupil, retina (B) pupil, cornea, iris, lens, retina
(C) cornea, pupil, iris, lens, retina (D) cornea, iris, pupil, lens, retina
28. Mirages are formed due to the natural phenomena
- (i) Earth's terrestrial heating (ii) Reflection of light
(iii) Refraction of light (iv) Diffraction of light
(v) Total internal reflection of light
- (A) (i), (iii) and (v) (B) (i), (ii) and (iv) (C) (ii), (iii) and (iv) (D) (iii), (iv) and (v)
29. Which of the following is the mirror image of **SMARTPREP** through a plane mirror :
- (A) ƆƎЯƆTɹAƆMƆ (B) ƆMΛƆTɹƆƎƎ
(C) ƎMΛɹɹƎP (D) ƎƎɹɹTɹAƆMƆ
30. If the temperature of a conductor is increased, its resistance will :
- (A) Not increase (B) Increase
(C) Decrease (D) Change according to the whether

CHEMISTRY

This section contains 10 Multiple Choice Questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct

31. In which of the following reactions heat energy is not released ?
- (A) $C + O_2 \rightarrow CO_2$ (B) $CaO + H_2O \rightarrow Ca(OH)_2$
(C) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ (D) $NH_4OH \rightarrow NH_3 + H_2O$

32. Chemical equation for the combustion of methanol is as follows :
- $$xCH_3OH(g) + yO_2(g) \rightarrow zCO_2(g) + 4H_2O(g)$$
- What is the value of 'x, y and z' in the equation respectively?
- (A) 1, 2 and 3 (B) 1, 2 and 4 (C) 2, 3 and 4 (D) 2, 3 and 2.
33. A brown and bright element "X" when heated in presence of air turns into black substance "Y". If hydrogen gas is passed over this heating material again "X" is obtained. "X" and "Y" are
- (A) Cu and CuO (B) S & SO₂ (C) C & CO₂ (D) Na and NaH
34. A colourless gas B is produced when egg shell is treated with a solution A. The gas B turns lime water milky. What are A and B?
- (A) A = NaCl & B = CO₂ (B) A = HCl & B = CO₂
(C) A = NaCl & B = Cl₂ (D) A = H₂SO₄ & B = O₂
35. Strength of caustic soda solution is 2g/ litre. pH of this solution will be (log² = 0.30) [Na = 23, K=39, O = 16, H = 1]
- (A) 11.9 (B) 9.7 (C) 10.8 (D) 12.7
36. One drop of methyl orange solution when added to the solution obtained after electrolysis of a concentrated solution of NaCl with Pt electrodes, the colour of the solution will turn:
- (A) Orange (B) Pink (C) Yellow (D) Colourless
37. Metals like Na, K, Ca and Mg are extracted by electrolysis of their chlorides in molten state. These metals are not extracted by reduction of their oxides with carbon because :
- (a) Reduction with carbon is very expensive
(b) Carbon readily makes alloys with these metals
(c) Carbon has less affinity for oxygen
(d) Carbon is a weaker reducing agent than these metals.
- (A) a and b (B) b and c (C) c and d (D) d and a
38. A metal X on heating in nitrogen gas gives Y. Y on treatment with H₂O gives a colourless gas which when passed through CuSO₄ solution gives a blue colour. Y is
- (A) Mg(NO₃)₂ (B) Mg₃N₂ (C) NH₃ (D) MgO

39. A metal carbonate X on treatment with a mineral acid liberates a gas which when passed through aqueous solution of a substance Y gives back X. The substance Y on reaction with the gas obtained at anode during electrolysis of brine gives a compound Z which can decolorise coloured fabrics. The compounds X, Y and Z respectively are
- (A) CaCO_3 , Ca(OH)_2 , CaOCl_2 (B) Ca(OH)_2 , CaO , CaOCl_2
 (C) CaCO_3 , CaOCl_2 , Ca(OH)_2 (D) Ca(OH)_2 , CaCO_3 , CaOCl_2
40. SMARTPREP students, Harsh (City Topper in IIT,2023), Ayushi (Girls City Topper in IIT,2023), Arvind (City Topper in 2022) were given test tubes having solutions with pH 1.2, 13.5 and 10.0 respectively. The correct order of decreasing OH^- ion concentration in these solutions is :
- (A) Harsh > Arvind > Ayushi (B) Ayushi > Harsh > Arvind
 (C) Arvind > Ayushi > Harsh (D) Ayushi > Arvind > Harsh

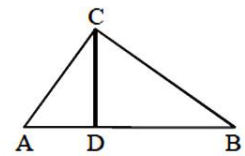
MATHEMATICS

This section contains 20 Multiple Choice Questions. Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct

41. Arrange in ascending order $\sqrt[5]{7}, \sqrt[4]{3}, \sqrt[12]{48}$
- (A) $\sqrt[4]{3}, \sqrt[12]{48}, \sqrt[5]{7}$ (B) $\sqrt[12]{48}, \sqrt[4]{3}, \sqrt[5]{7}$ (C) $\sqrt[5]{7}, \sqrt[12]{48}, \sqrt[4]{3}$ (D) None of these
42. If zeroes of the polynomial $f(x) = x^3 - 3px^2 + qx - r$ are in A.P, then:
- (A) $2p^3 = pq - r$ (B) $2p^3 = pq + r$ (C) $p^3 = pq - r$ (D) None of these
43. Find the value of $\frac{\cos 60^\circ + \sin 45^\circ - \cot 30^\circ}{\tan 60^\circ + \sec 45^\circ - \operatorname{cosec} 30^\circ} \div \frac{\sin 30^\circ + \sin 45^\circ - \tan 60^\circ}{\cot 30^\circ + \operatorname{cosec} 45^\circ - \sec 60^\circ}$
- (A) $\frac{2 + \sqrt{2} - 2\sqrt{6}}{2\sqrt{6} + 4 - 4\sqrt{2}}$ (B) 1 (C) 0 (D) $\frac{2 - \sqrt{2} - 2\sqrt{6}}{2\sqrt{6} + 4 + 4\sqrt{2}}$
44. If $\sin \theta + \cos \theta = 1$, then $\sin \theta \cos \theta$ is equal to
- (A) 0 (B) $\frac{1}{\sqrt{3}-1}$ (C) 1 (D) $\frac{1+\sqrt{2}}{1-\sqrt{3}}$

45. In the following figure $\angle ACB = 90^\circ$ and $CD \perp AB$. If $AD = 4$ cm and $BD = 9$ cm

then the ratio $BC : AC$ is



- (A) 3 : 2 (B) 2 : 3 (C) 16 : 81 (D) 81 : 16

46. The median and mode of a frequency distribution are 525 and 500 then mean of same frequency distribution is :

- (A) 75 (B) 107.5 (C) 527.5 (D) 537.5

47. A, B, C are three sets of values of x:

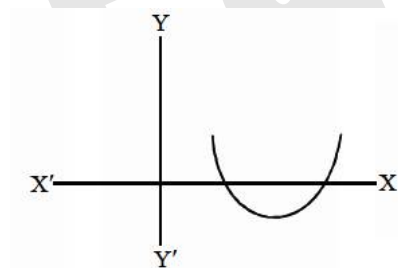
A : 2, 3, 7, 1, 3, 2, 3 B : 7, 5, 9, 12, 5, 3, 8 C : 4, 4, 11, 7, 2, 3, 4

Select the correct statement among the following.

- (A) Mean of A is equal to Mode of C (B) Mean of C is equal to Median of B
(C) Median of B is equal to Mode of A (D) Mean, Median and Mode of A are same

48. For the below figure of $ax^2 + bx + c = 0$

- (A) $a < 0, D > 0$
(B) $a > 0, D < 0$
(C) $a > 0, D > 0$
(D) $a < 0, D < 0$



49. If the 15th term of an A.P. is 121 and 25th term is 201, then the 35th term of the A.P. is

- (A) 292 (B) 281 (C) 264 (D) 275

50. A body falls 16 meters in the first second of its motion, 48 metres in the second, 80 metres in the third and so on. How long will it take to fall 4096 metres?

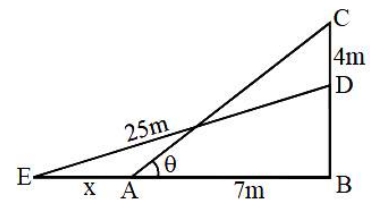
- (A) 16 seconds (B) 18 seconds (C) 8 seconds (D) 6 seconds

51. The sum $\frac{1}{1+1^2+1^4} + \frac{2}{1+2^2+2^4} + \frac{3}{1+3^2+3^4} + \dots + \frac{99}{1+99^2+99^4}$ is lie between?

- (A) 0.46 and 0.47 (B) 0.47 and 0.48 (C) 0.48 and 0.49 (D) 0.49 andn 0.50

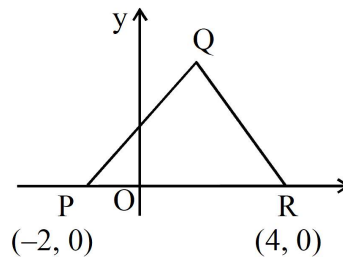
52. A 25m long ladder is placed against a vertical wall such that the foot of

the ladder is 7m from the feet of wall. if the top of the ladder slides down by 4m by how much distance will the foot of the ladder slide?



- (A) 5 (B) 8m (C) 9m (D) 15m

53. In the diagram, PQR is an isosceles triangle and $QR = 5$ units. it is given that $PQ = QR$. The coordinates of Q are :



- (A) (1, 5) (B) (3, 4) (C) (2, 4) (D) (1, 4)

54. SMARTPREP ACADEMY is a renowned institute for engineering, medical & pre - foundation exam preparation. Arvind achieved a remarkable rank of AIR 288 conducted by IIT. The institute wants to acknowledge his achievement by calculating his percentile rank. If there were a total to 1,00,000 students who appeared for the same exam, What would be Arvind's Percentile rank?

$$\left[\text{Percentile Rank} = \frac{T - R + 1}{T} \times 100 \right]$$

Where, T = Total number of students

R = Rank of student

- (A) 99.411 (B) 99.512 (C) 99.713 (D) 99.614

55. The radius of a circle with centre $(-2, 3)$ is 5 units. The point $(2, 5)$ lies:

- (A) on the circle (B) inside the circle (C) outside the circle (D) None of these

56. Value of x, y which satisfies $3x + 5y = 12xy$ and $7x - 2y = 4xy$ are

- (A) $x = \frac{37}{31}, y = \frac{41}{31}$ (B) $x = \frac{41}{72}, y = \frac{41}{44}$ (C) $x = 1, y = 2$ (D) $x = \frac{32}{41}, y = \frac{44}{41}$

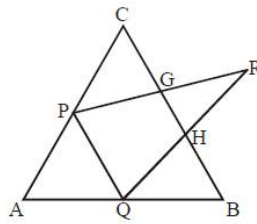
57. Find the value of $(3x + 2y - 3z)(9x^2 + 4y^2 + 9z^2 - 6xy + 6yz + 9xz)$ if $x = 2, y = 1, z = -1$.

- (A) 143 (B) 431 (C) 217 (D) 912

58. If $(x-1)^2 + (y-3)^2 + (z-5)^2 + (t-7)^2 = 0$, then $xyzt + 16$ is equal to

- (A) 5^2 (B) 9^2 (C) 11^2 (D) 12^2

59. In the given figure, P and Q are the mid-points of AC and AB. Also $PG = GR$ and $HQ = HR$. What is the ratio of area of ΔPQR to area of ΔABC ?



- (A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) $\frac{3}{5}$ (D) None of these

60. A balloon of radius r subtends an angle α at the eye of an observer and the elevation of the centre of the balloon from the eye is β , then the height h of the centre of the balloon is given by

- (A) $\frac{r \sin \beta}{\sin \alpha}$ (B) $r \sin \beta \sin \alpha$ (C) $\frac{r \sin \beta}{\sin(\alpha / 2)}$ (D) $\frac{r \sin \alpha}{\sin(\beta / 2)}$

ANSWERS KEY

Question	Answer	Question	Answer	Question	Answer
1	A	26	A	51	D
2	D	27	D	52	B
3	B	28	A	53	D
4	B	29	A	54	C
5	B	30	B	55	B
6	A	31	D	56	B
7	D	32	D	57	A
8	B	33	A	58	C
9	A	34	B	59	A
10	D	35	D	60	C
11	B	36	C		
12	D	37	C		
13	C	38	B		
14	D	39	A		
15	D	40	C		
16	C	41	A		
17	D	42	A		
18	B	43	B		
19	D	44	A		
20	A	45	A		
21	C	46	D		
22	D	47	D		
23	C	48	C		
24	C	49	B		
25	B	50	A		



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