

# 5.1

## CHAPTER

### OFFICIAL SUPR SAMPLE PAPER

1. Choose the correct alternative that will continue the same pattern and fill in the blank spaces. 2, 7, 14, 23, \_\_\_, 47  
 (a) 34      (b) 31      (c) 38      (d) 27      (e) None of these
  
2. It is postulated that huge deposits of NaCl (rock salt) and CaCO<sub>3</sub> (chalk and marble) are sites of erstwhile oceans, where the salts had been concentrated through weathering by rain and wind and leaching by rivers. Select the correct explanatory statement in this context.  
 (a) Both NaCl and CaCO<sub>3</sub> are highly soluble in water.  
 (b) NaCl is soluble in water but CaCO<sub>3</sub> is not. Hence, concentration of CaCO<sub>3</sub> in the oceans through weathering is an untenable hypothesis.  
 (c) The solubility of CaCO<sub>3</sub> in water is pH dependent and is enhanced by acidic atmospheric gases. Hence, CaCO<sub>3</sub> may be leached into water during weathering.  
 (d) NaCl and CaCO<sub>3</sub> are igneous rocks and have crystallized as such during the slow cooling process when the earth was born. Hence, the ocean postulates are baseless.
  
3. A known positive charge is located at point P as shown above, between two unknown charges, Q<sub>1</sub> and Q<sub>2</sub>. P is closer to Q<sub>2</sub> than Q<sub>1</sub>. If the net electric force acting on the charge at P is zero, it may correctly be concluded that:  
 (A) Both Q<sub>1</sub> and Q<sub>2</sub> are positive  
 (B) Both Q<sub>1</sub> and Q<sub>2</sub> are negative  
 (C) Q<sub>1</sub> and Q<sub>2</sub> have opposite signs  
 (D) Q<sub>1</sub> and Q<sub>2</sub> have the same sign, but magnitude of Q<sub>1</sub> is greater than the magnitude of Q<sub>2</sub>
  
4. If log<sub>2</sub> = 0.30103 and log<sub>3</sub> = 0.4771, find the number of digits in (648)<sup>5</sup>.  
 (a) 23.      (b) 15.      (c) 13.      (d) 14.      (e) 22.
  
5. Which of the following solutions, when mixed, will not form a buffer solution?  
 (a) 100 mL 0.1 M NaOH + 50 mL 0.1 M CH<sub>3</sub>COOH  
 (b) 50 mL 0.1 M NaOH + 100 mL 0.1 M CH<sub>3</sub>COOH  
 (c) 50 mL 0.1 M NH<sub>4</sub>OH + 50 mL 0.1 M CH<sub>3</sub>COOH  
 (d) 50 mL 0.1 M HCl + 100 mL 0.1 M CH<sub>3</sub>COONa
  
6. A man can cover a distance in 1hr 24min by covering 2/3 of the distance at 4 km/h and the rest at 5km/h. The total distance is  
 (a) 2km      (b) 5km      (c) 6km      (d) 10km      (e) None of these
  
7. Three identical masses are at the three corners of the triangle, connected by massless identical springs (rest length l<sub>0</sub>) forming an isosceles right-angle triangle. If the two sides of equal length (of length 2l<sub>0</sub>) lie along positive x-axis and positive y-axis, then the force on the mass that is not at the origin but on the x-axis is given by ax^ + by^ with  
 (a) a = 1 and b = 0

- (b)  $a = 0$  and  $b = 1$   
 (c)  $a = -\sqrt{2}$  and  $b = 1$   
 (d)  $a = -2$  and  $b = 0$   
 (e)  $a = -2$  and  $b = 1$
8. Asim got thrice as many sums wrong as he got right. If he attempted 60 sums in all, how many sums did he solve correctly?  
 (a) 25      (b) 12      (c) 20      (d) 10      (e) 15
9. A system consists of N particles, interacting with each other (for example, protein molecule). Which one of the following statements is FALSE?  
 (a) The motion of the system can be split into translational, rotational and vibrational motions  
 (b) Number of rotational degrees of freedom are 3  
 (c) Number of translational degrees of freedom are 3  
 (d) Number of vibrational degrees of freedom are 3  
 (e) The system, if isolated, will conserve both total energy and total angular momentum.
10. Three pipes A, B and C can fill a tank in 6 hrs. After working at it together for 2 hrs C is closed and A and B can fill the remaining part in 7 hrs. The total number of hrs taken by C alone to fill the tank is  
 (a) 14      (b) 12      (c) 11      (d) 10      (e) 13
11. A square closed loop of area A, lying in the horizontal plane, is moving horizontally with velocity  $v$  in a uniform vertical magnetic field  $B$ . Which one of the following statements is FALSE?  
 (a) There is current in the loop even though there is no battery (or any other voltage source)  
 (b) The work done in moving the coil is being converted to the current in the coil  
 (c) The current is being generated because the magnetic field is doing the work.  
 (d) the emf generated is proportional to the velocity of the coil (e) the emf generated is proportional to the magnetic field strength
12. Two liquids A and B are mixed in such a proportion that they form an ideal solution whose total vapor pressure is exactly three times that of the partial pressure of A. If  $P_A^o$  and  $P_B^o$  are the vapor pressures of pure A and B respectively, then the total vapor pressure of the solution is given by Options:  
 (a)  $\frac{2P_A^o P_B^o}{3P_A^o + P_B^o}$       (b)  $\frac{3P_A^o P_B^o}{P_B^o + 2P_A^o}$       (c)  $\frac{2P_A^o}{2P_A^o + P_B^o}$       (d)  $\frac{2P_B^o}{P_A^o + 2P_B^o}$   
 (e) more data needed to solve the problem
13. If  $P_o$  and  $P_s$  are the vapour pressures of the solvent and solution respectively and  $X_0$  and  $X_s$  are mole fractions of solvent and solute respectively, then  
 (a)  $P_0 = X_s P_s$     (b)  $P_s = X_0 P_0$     (c)  $P_0 = X_0 P_s$     (d)  $P_s = X_s P_0$
14. The velocity of the nitrogen molecule in room temperature air is:  
 (a) zero      (b)  $10 \text{ m s}^{-1}$     (c)  $100 \text{ m s}^{-1}$     (d)  $500 \text{ m s}^{-1}$     (e)  $5000 \text{ m s}^{-1}$
15. Helium is two times heavier than H<sub>2</sub>. The average kinetic energy per molecule for helium at 300K is  
 (a) twice as H<sub>2</sub>      (b) same as H<sub>2</sub>      (c) half as H<sub>2</sub>      (d) one fourth of H<sub>2</sub>

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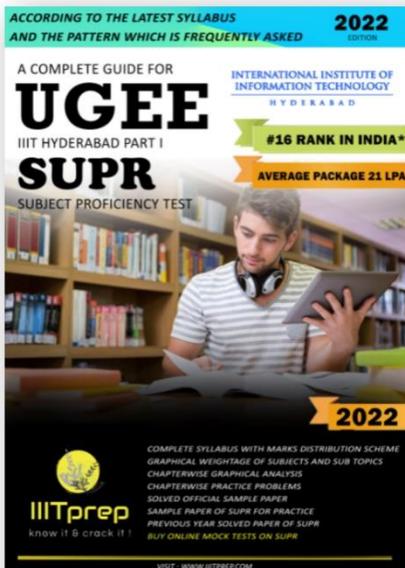
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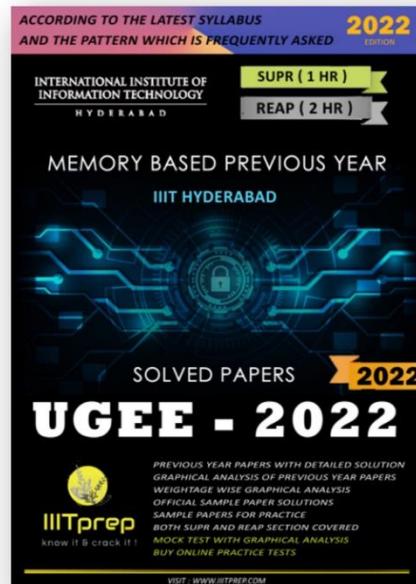
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## ----- Answers -----

1	A	2	C	3	D	4	B	5	A
6	C	7	E	8	E	9	C	10	A
11	C	12	B	13	B	14	C	15	B

## ----- Solutions -----

1. Difference (Next term – Previous term) between two consecutive No. is in AP, i.e., Difference between No is 5, 7, 9, 11, 13.  
 So,  $23+11=34$ .

2. Direct Statement From NCERT.

The solubility of  $\text{CaCO}_3$  in water is pH dependent and is enhanced by acidic atmospheric gases.  
 Hence,  $\text{CaCO}_3$  may be leached into water during weathering.

3. To Balance the Forces, it is clear that  $Q_1$ ,  $Q_2$  must have same sign of charges by which Both will Attract or Both will Repel to Balance the forces.

As the Distance of the positive charge placed between  $Q_1$  and  $Q_2$  is not same from  $Q_1$  and  $Q_2$ , So the Magnitude of electric force on positive charge by  $Q_1$  and  $Q_2$  will be different.  $F = kq_1q_2/d$  as  $F \propto 1/d$  (Inversely Proportion) so in between  $Q_2$  & P as d is Less Hence F is more to Balance it so,  $Q_2$  must be more.

4. You must know and Remember that No. of Significant Digit before decimal = [ (Characteristic)<sub>base 10</sub> + 1]

To find  $(\text{Characteristic})_{\text{base } 10}$ ,

Revise Topics Mentioned in UGEE SUPR Guide Available on IIITprep.com

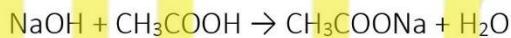
$$\begin{aligned} \log(648)^5 &= 5(\log 648) = 5(\log 2^3 \cdot 3^4) = 5[3\log 2 + 4\log 3] \\ &= 5[3(0.301) + 4(0.4771)] \end{aligned}$$

$$(\text{Characteristic})_{\text{base } 10} = 14$$

So, the no. Of significant digits before decimal is  $14+1 = 15$ .

5. Buffer Solution is a Solution which Resist change in pH when acid or base is added to it.

For a Buffer Solution: Existence of both weak part & its Conjugate is Required.



In (A) As NaOH is more than  $\text{CH}_3\text{COOH}$  so,  $\text{CH}_3\text{COOH}$  will be the LR (Limiting Reagent) and will be finished & NaOH will remain in solution and no conjugate will be formed.

6. Revise Topics from UGEE SUPR Guide Available on IIITprep.com

Say Total Distance be d

Speed = distance / time (convert 1 hour 24 minutes to hour)

$$(2d/3)/4 + (d/3)/5 = 1 + 24/60$$

So, get  $d = 6 \text{ Km}$

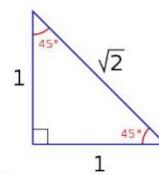
Extra: - To convert from km/h to m/s multiply km/h with  $5/18$ .

7. Que Directly from NCERT Exemplar Available on IIITprep.com SUPR Book

Mainly 2 types of forces are Considered here

1. Gravitational Force
2. Spring Force

The Spring force is  $-kx^2$  where x is Elongation. Now take the Proper Direction of Forces. Resolve its Component along x axis & y axis i.e.  $-2i + j$  so,  $a = -2$  &  $b = 1$



8. Say If He got x Sums right

So, He gets  $3x$  sums Wrong. So,  $60 = x + 3x$ .

So,  $x = 15$

9. A. True, Translational, Rotational, Vibrational are types of Motion.

B. True, Rotational Degree = 3 as per KTG

C. False, Translational Degree = 2 as per KTG

D. True, Vibrational Degree = 3 as per KTG

E. True, In Isolation, Conservation of Energy & Angular Momentum is valid.

10. First Understand How to Solve this type of Work Problem Revise **Time & Work Section** from SUPR & REAP Guide Book from IIITprep.com.

Say Pipe A can do a piece of work in 1 hr

Say Pipe B can do b piece of work in 1 hr

Say Pipe C can do c piece of work in 1 hr

$$\text{So, } (a+b+c)6 = 1 \quad \text{----- 1st Condition}$$

$$(a+b+c)2 + (a+b)7 = 1 \quad \text{----- } 2(1/6) + (a+b)7 = 1$$

$$\text{So, } a+b = 2/21 \quad \text{----- Eqn 1}$$

$$\text{So, } c = 1/6 - 2/21 = 1/14$$

Now C can do  $1/14$  piece of work Hence, 1 piece of work can be done by C in 14 days.

11. A. True, EMF will be induced by Motional EMF

B. True, Conservation of Work & Energy. Coz, Work done by Magnetic Field is zero.

C. False, always work done by Magnetic Field is Zero because, Direction of Force and Displacement are Perpendicular so, Dot Product is Zero always.

D. True,  $E = [V \times B \cdot dl]$  where, V = Velocity and E = EMF

E. True,  $E = (V \times B) \cdot dl$  where B = Magnetic Field and E = EMF

12. Revise Main Topics from IIITprep SUPR BOOK @ IIITprep.com

You must Know: Total Pressure  $P_T = P_A + P_B$  Where  $P_A$  is Partial Pressure

And  $P_A = P^0_A X_A$  where  $P^0_A$  = Vapor Pressure and  $X_A$  = Mole Fraction of A

Similarly, for  $P_B = P^0_B X_B$

We Know  $X_A + X_B = 1$  ----- Sum of Mole Fractions

$$\begin{aligned} \text{Given: } P_T &= 3 P_A = P_A + P_B \\ &= 3 P^0_A X_A \quad \text{----- 3} \end{aligned}$$

So,  $2P_A = P_B$

$$2P^0_A X_A = P^0_B X_B \quad \text{----- 1}$$

$$X_A + X_B = 1 \quad \text{----- 2}$$

From 1 & 2 we get  $X_A = P^0_B / (2P^0_A + P^0_B)$  Put  $X_A$  in 3 We Get Ans as

$$P_T = 3P^0_A P^0_B / (2P^0_A + P^0_B)$$

13. Revise Main Topics from IIITprep SUPR BOOK @ IIITprep.com

$P_{SA} = P^0_A X_A$  General Formula to Be Remembered. Direct Que From NCERT.

Acc. To Raoul's law

$P_o - PS$  whole divided by  $P_o$  is equal to the mole fraction of solute which is  $X_s$

$$X_s + X_o = 1$$

14. Direct from NCERT But Approximate Value can be Calculated

By,  $V_{rms} = \sqrt{(3RT/M)}$  Formula

Nitrogen molecule contains 28 nucleons and nitrogen atom contains 14 nucleons.

## 15. Method (1)

$$\text{KE} \propto mv^2 \quad \text{Velocity} \propto \sqrt{T/M} \quad \text{as } V_{\text{rms}} = \sqrt{3RT/M}$$

$$\text{KE} \propto MT/M \quad \text{Velocity}^2 \propto (T/M)$$

$$\text{KE} \propto \text{Temp}$$

So, as Temp is Constant, KE will Remain Constant so, it is Independent of Masses.

## Method (2)

As the average Kinetic energy of a particle in an ideal gas equation is: -

$$\text{KE} = 3/2kT, \text{ where } k \text{ is Boltzmann's constant and } T \text{ is temperature}$$

By this formula we can see that at a constant temperature, average kinetic energy remains constant and is independent of mass.

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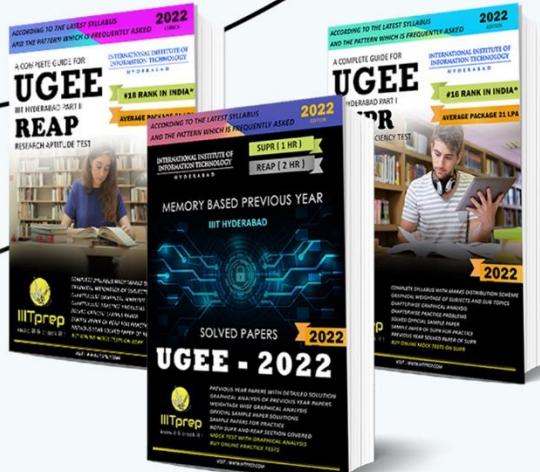
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# 3.2

## CHAPTER

### OFFICIAL REAP SAMPLE PAPER

1. Two chairs (A and B) are in an empty room overnight. Chair A is made of steel while chair B is made of wood. In the night and in the morning, the temperature of the room is 290 K. In the morning, a person chooses between Chair A and Chair B as the seat by feeling (touching) the chair and choosing one which feels warmer. Person chooses   (BLANK-1)   as it feels warmer because   (BLANK-2)   has   (BLANK-3)     (BLANK-4)   than   (BLANK-5)  .

- (A) BLANK-1: Chair A, Chair B, neither chair
- (B) BLANK-2: metal, wood, air, human body
- (C) BLANK-3: higher, lower, different, same
- (D) BLANK-4: heat capacity, heat conductivity, electrical resistance
- (E) BLANK-5: metal, wood, air, human body

2. Consider a rope fixed at both ends under tension so that it is horizontal (i.e., assume the rope is along x-axis, with gravity acting along z-axis). Now the right end is continually oscillated at high frequency  $n$  (say  $n=100$  Hz) horizontally and in a direction along the rope; amplitude of oscillation is negligible. The oscillation travels along the rope and is reflected at the left end.

Let the total length of rope be  $l$ , total mass be  $m$  and the acceleration due to gravity be  $g$ .

After initial phase (say a minute or so), the rope has   (BLANK-1)   wave, which is   (BLANK-2)   in nature. It results from superposition of left travelling and right travelling   (BLANK-3)   waves. This resulting wave has a frequency   (BLANK-4)   that of oscillation frequency  $n$ . Simple dimensional analysis indicates that the frequency of can be of the form:   (BLANK-5)  .

- (A) BLANK-1: travelling, oscillating, stationary, regular
- (B) BLANK-2: transverse, longitudinal, regular, irregular
- (C) BLANK-3: transverse, longitudinal, regular, irregular
- (D) BLANK-4: equal to, half, double, independent from
- (E) BLANK-5:  $\sqrt{g/l}$ ,  $\sqrt{mg}$ ,  $\sqrt{mg/l}$ ,  $\sqrt{l/g}$

3. When I was a child, there used to be a fair in my town during the Diwali and Id festivities. Among the many things I saw was a strange puppet show. There were three puppets, one of a man, another of a woman and the third one of a rakshasa (demon). Whenever the rakshasa was brought close to the woman, she would turn her face away. But when the man was brought close to her, she would turn back and face the man.

I and my friends looked at this show and argued for hours what caused the woman to turn her face. Choose one or more of the options below about my childhood experience above:

- (A) The strange behaviour of the woman puppet was:

1. definitely because someone was moving it with sticks or strings.
2. definitely because there were magnets fixed in the heads of all three puppets.
3. could be because of magnets in the heads of all three puppets or someone moving them with sticks strings.
4. just a random thing. Since we were children then, we thought it was happening in a particular way.

(B) If there were magnets fixed in the heads the puppets inside the head such that one end of the mag was at the mouth (M) and the other at the back of the head (B), then the arrangement of the north (N) : south (S) poles of the magnets must be like:

1. man: M-N, B-S; woman: M-N, B-S; demon: M-N, B-S
2. man: M-N, B-S; woman: M-S, B-N; demon: M-S, B-N
3. man: M-S, B-N; woman: M-S, B-N; demon: M-S, B-N
4. man: M-S, B-N; woman: M-N, B-S; demon: M-S, B-N

(C) One of my friends stayed back one day at the show and kept looking at the puppets for a long time asked the manager of the show to move the puppets in certain ways. The manager as a kind person a with my friend insisting, he agreed to do what my friend asked for. But he did not the friend if there wer magnets in the puppets. But the next day, the friend told us that he was sure that there were magnets inside the puppets' faces. What did he ask the manager to do and what could he have seen? He must the effect after asking for moving the puppets

1. backwards towards each other.
2. at different speeds.
3. up and down.
4. On the same plane, but in different directions.

4. Your teacher uses a weighing balance to take equal amounts of two substances, tartaric acid and washing soda, say 1g. Each is dissolved separately into 100 cc of water.

(A) In 1 drop of the acid solution and 1 drop of the basic solution, we have

1. equal amount of acid and base respectively
2. equally acidic and basic substance respectively
3. acidity in one and basicity in the other are not equal
4. equal magnitude of the quantity |pH-7|

(B) Take a few cc of the acidic solution in a test-tube and mix a few drops of coloured phenolphthalein solution ((prepared in basic medium)) into it. Which of the following may be happening?

1. The colour of the solution instantly changes pink
2. remains colourless as the colour of the added drops disappears
3. the colour diffuses through the solution and finally disappears
4. the colour diffuses through the solution and finally the entire solution acquires a faint pink colour.

5. How many solutions are there to the equation  $x_1 + x_2 + x_3 + x_4 = 17$ , where  $x_1, x_2, x_3, x_4$  are nonnegative integers?
- (A) 1140. (B) 1160. (C) 1040. (D) 1200.

6. The function  $f(x)$  is defined as follows:

$$f(x) = 2+x \text{ if } x >= 0$$

$f(x) = 2-x$  if  $x <= 0$  Then function  $f(x)$  at  $x=0$  is:

1. continuous and differentiable
2. continuous but not differentiable
3. differentiable but not continuous
4. neither continuous nor differentiable

7. Consider a group of 20 people. If everyone shakes hands with everyone else, how many hand-shakes take place?

1.  ${}^{19}C_2$ .
2.  ${}^{20}C_2$ .
3.  ${}^{20}C_{19}$ .
4.  $(20)^2$ .

8. A pair of fair-dice is rolled. What is the probability that the second die lands on a higher value than the first?

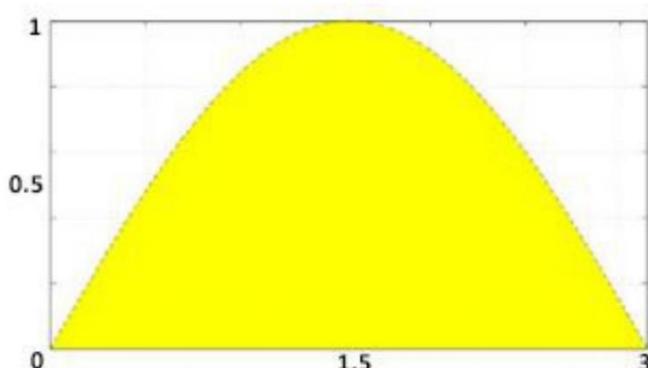
1.  $1 / 36$ .
2.  $5 / 36$ .
3.  $1 / 6$ .
4.  $5 / 12$ .
5.  $15/36$ .



9. This question is based on below graph:

Which number below represents the area of the shaded curve to the closest value.

1. 1
2. 1.5
3. 2
4. 3



10. Papago Problem: Tohono O'odham, formerly known as Papago, is spoken in south central Arizona in the U.S. and in northern Sonora in Mexico.

Match each Tohono O'odham sentence with its English translate

- |                                       |  |
|---------------------------------------|--|
| 1. Ha-cecposid 'o g wakial g wipsilo. | A. I am speaking                         |
| 2. Pi 'ac ñeñok 'a:cim.               | B. The man is speaking.                  |
| 3. Ceposid 'o g wakial g wisilo.      | C. I am working.                         |
| 4. Pi 'o cickpan g cecoj.             | D. The cowboys aren't branding the calf. |
| 5. Pi 'o ceposid g wapkial g wisilo.  | E. We are not speaking.                  |
| 6. Cipkan 'añ 'a:ñi.                  | F. The men are working.                  |
| 7. Ñeok 'o g ceoj.                    | G. The cowboy is branding the calf.      |
| 8. Ñeok 'añ 'a:ñi.                    | H. The cowboy is branding the calves.    |
|                                       | I. The men are not working.              |

11. Given below is an encrypted sentence.

SJ HVJ HMM GPVC BHI. LPBJ VJBHEC LP. – LHBZJM GJFAJXX

Decode it based on the clues given below.

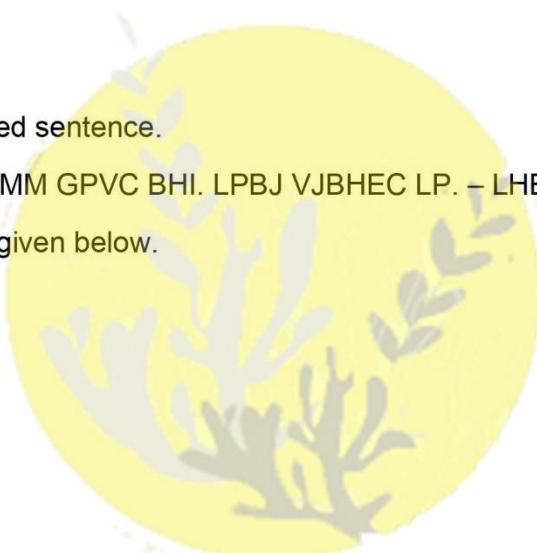
Clue-1: H stands for A

Clue-2: stands for E

Clue-3: C stands for N

Clue-4: L stands for S

Clue-5: I stand for D



(A) The word GPVC is decoded as \_\_\_\_\_

1. fern 2. born 3. moan 4. burn

(B) The word HVJ is decoded as \_\_\_\_\_

1. pie 2. lie 3. die 4. are

(C) The word LPBJ is decoded as \_\_\_\_\_

1. some 2. sore 3. sole 4. site

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12. Swahili, a Bantu language, is spoken in the southern of Africa and along east coast of Africa. The following are certain dates in Swahili given along with their English translations in a random order. Match the Swahili dates to the correct English translations:

Swahili Dates:	English translations in random order:
1. tarehe tatu Disemba jumamosi	A. Monday, October 5 <sup>th</sup>
2. tarehe tano Oktoba jumapili	B. Tuesday, April 2 <sup>nd</sup>
3. tarehe pili Aprili jumanne	C. Wednesday, October 5 <sup>th</sup>
4. tarehe tano Oktoba jumatatu	D. Tuesday, April 4 <sup>th</sup>
5. tarehe nne Aprili jumanne	E. Sunday, October 5 <sup>th</sup>
6. tarehe tano Oktoba jumatano	F. Saturday, December 3 <sup>rd</sup>
	G. Sunday, December 3rd
	H. Saturday, July 1st

Now, translate the following into Swahili using the given words:

tatu    tarehe    pili    jumatano    jumapili    Disemba    tarehe    Aprili

(A) Wednesday, April 3rd: \_\_\_\_\_

(B) Sunday, December 2nd: \_\_\_\_\_

## IIITprep UGEE 2021 Results

RESULTS SPEAKS FOR ITSELF.

<b>UGEE AIR 4</b>  NISHITA SINGH 2021 BATCH	<b>UGEE AIR 4</b>  HARSHVARDHAN 2021 BATCH	<b>UGEE AIR 19</b>  SAI MADHUSUDAN 2021 BATCH	<b>UGEE AIR 20</b>  BHAV BERI 2021 BATCH	<b>UGEE AIR 29</b>  KHUSHI WADHWA 2021 BATCH	<b>UGEE AIR 43</b>  BALABHADRA SAKETH 2021 BATCH
<b>UGEE AIR 51</b>  SREENIVAS B. PAPIREDDY 2021 BATCH	<b>UGEE AIR 60</b>  RIDHIMAN K. DHINDSA 2021 BATCH	<b>UGEE AIR 80</b>  UTSAV SHEKHAR 2021 BATCH	<b>UGEE AIR 100</b>  ARJUN DOSAJH 2021 BATCH	<b>UGEE AIR 133</b>  SRIHARI BANDARUPALLI 2021 BATCH	<b>UGEE AIR 157</b>  BOLLIMUNTHA SHREYA 2021 BATCH
<b>121.5/150</b>  YASH AGARWAL 2021 BATCH	<b>105/150</b>  SANSKAR RANJAN 2021 BATCH	<b>102.5/150</b>  SIDDHARTH KOTHARI 2021 BATCH	<b>100/150</b>  ANIRUDDH PRAMOD 2021 BATCH	<b>99.5/150</b>  RISHI AGRAWAL 2021 BATCH	<b>99.5/150</b>  GAGAN CHOPRA 2021 BATCH

6 in Top 50 AIR

4 in Top 20 All India Rank.

10 in Top 20 AIR

----- **Answers** -----

1	A. Chair B B. Wood C. Lower D. Heat Conductivity E. Metals	2	A .Stationary B. Transverse C. Transverse D. Independent from E. $\sqrt{g/l}$	3	[A]2 [B]2 [C]1	4	[A]3 [B]3	5	A
6	[2]	7	[2]	8	[5]	9	[2]	10	See in Solution
11	[A]2 [B]4 [C]1	12[A]	tarehe tatu Aprilji jumatano	12 [B]	tarehe pilli Disemba jumapili				

----- **Solutions** -----

1. A. Chair B  
B. Wood  
C. Lower  
D. Heat Conductivity  
E. Metals

Self-Explanatory about fact that wood has Lower Heat Conductivity. By Which Wood doesn't reach to much Higher & Low Temperature. As it is Cold 17°C in Morning & Night So, Wood maintains its Temp and feels warmer.

2. NCERT Based Exemplar Que.

Hint: - String waves are transverse waves and two string waves of same frequency travelling in opposite direction forms a standing wave (stationary wave). Frequency F can be of the type  $nv/2l$  and as  $v = \sqrt{gl}$

So, we can find F as  $\sqrt{gl}$  or another approach may be dimensional analysis. As we know that Frequency = 1/Time, so whichever option will give the unit of frequency opposite of time will be our answer.

3. A. Magnetic Attraction & Repulsion Properties must be used.

B. Woman Head & demon Head Repels means, they must have Similar Poles coz, Similar Poles Repels Hence option 4 got Rejected, now after Turning, Woman Back & Man Head must Repel means They must be Similar So, Option 1, 3 got Rejected also. Hence, option 2 is Correct  
Get More Logical Reasoning Questions Like this on [iiitprep.com](http://iiitprep.com)

C. Backwards towards each other.

By this His Friend can get to know the Poles if Magnets were there which Confirms Presence of Magnets in it.

4. A. Initially there will be different no. of moles in 1 gm sample of each because of different Molar Masses. As a Result, Molarity will also change. So, Acidic & Basic Concentration will Differ so, Acidity in one and Basicity in other are not Equal.

B. The Phenolphthalein (Prepared in Basic Medium) is an Acid Base Indicator Which Changes its colours to Pink in Basic Medium where as remains Colourless in Acidic Medium.

5. Beggar Method: Imagine such that, it is No. of ways in which 17 coins can be distributed to 4 Beggar. For 4 Partitions we need 3 Walls Hence, Beggar Method

Beggar Formula from SUPR Book

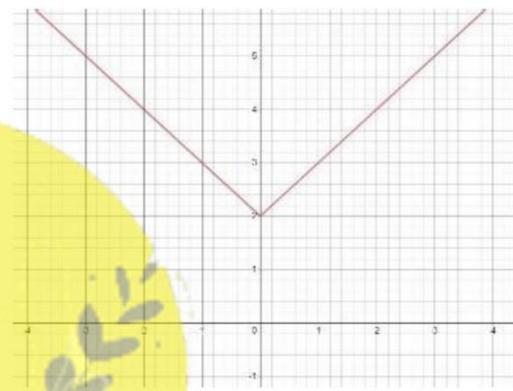
(No. of Beggar + No. of Partitions Walls)  $C$  (No. of Partitions Wall)

$$\text{i.e., } {}^{17+3}C_3 = {}^{20}C_3 = 1140$$

Remember: Here 0 Coins can be allotted to Beggar.

If There is Constrain that everyone must will get coin., Then First Distribute each coin to them So, Remining is  $17-4 = 13$  Hence Now Apply Beggar on 13 i.e.,  ${}^{13+3}C_3$  if constrain.

6. At  $x = 2$  Limit Exist but Sharp Corner so  
Continuous but Not Differentiable.



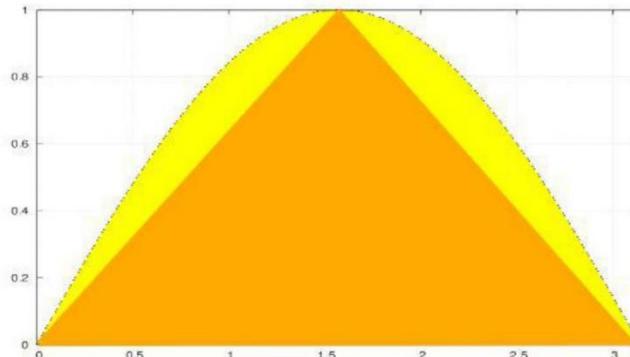
7. Selecting  $r$  out of  $n$  is  ${}^nC_r$   
Hence,  ${}^{20}C_2$  Selecting 2 hands for Handshake out of 20 hands/ Persons.

8. Below in Table:

First Die	Possible Outcomes from Second Die	Probability
1 ( $1/6$ )	2, 3, 4, 5, 6 ( $5/6$ )	$(1/6) \cdot (5/6)$
2 ( $1/6$ )	3, 4, 5, 6 ( $4/6$ )	$(1/6) \cdot (4/6)$
3 ( $1/6$ )	4, 5, 6 ( $3/6$ )	$(1/6) \cdot (3/6)$
4 ( $1/6$ )	5, 6 ( $2/6$ )	$(1/6) \cdot (2/6)$
5 ( $1/6$ )	6 ( $1/6$ )	$(1/6) \cdot (1/6)$

So, Total Sum is  $= 1/36[5+4+3+2+1] = 15/36$

9. Area in Yellow is Greater than Shaded area in Orange which is area of Simple Triangle can be calculated Easily,



Area in Yellow = Area in Orange + Extra =  $(3)(1)/2 + \text{Extra} = 1.5 + \text{Extra}$  So, Area is Greater than 1.5 and less than area of Rectangle i.e., 3.

10. Before Starting Revise This Topic from IIITprep UGEE Exam REAP Guide Available on [IIITprep.com](http://IIITprep.com)

**How might you arrive at the solution?** You might start by noticing that three of the English sentences contain the word *not*. You might guess that *pi* means *not* because it occurs in three Tohono O'odham sentences. The three English sentences containing *not* are *The men are not working*, *We are not speaking*, and *The cowboys are not branding the calf*. You could match up the longest English sentence with the longest Tohono O'odham sentence.

Pi 'o cepsid g wapkial g wisilo.      The cowboys are not branding the calf.

Now, one of these means *We are not speaking* and one means *The men are not working*.

Pi 'ac ñeñok 'a:cim.

Pi 'o cickpan g cecoj.

We occurs in only one English sentence, and 'ac ...'a:cim occurs only in one Tohono O'odham sentence. You might then conjecture that Pi 'ac ñeñok 'a:cim means *We are not speaking*. In that case, Pi 'o cickpan g cecoj would mean *The men are not working*.

Pi 'ac ñeñok 'a:cim.

We are not speaking.

Pi 'o cickpan g cecoj.

The men are not working.

Which words mean *speaking*, *working*, and *men*? *Speaking* occurs in three English sentences and *working* occurs in two. If you notice that *ñeñok* is related to *ñeok*, you can see that those words occur in three sentences.

Ñeok 'o g ceoj.

Ñeok 'añ 'a:ñi.

Pi 'ac ñeñok 'a:cim.

We are not speaking.

The three English sentences with *speaking* are *We are not speaking*, *I am speaking*, and *The man is speaking*. If you match *ceoj* in *Ñeok 'o g ceoj* with *cecoj* in *Pi 'o cickpan g cecoj*, you can conclude that *Ñeok 'o g ceoj* means *The man is speaking*.

Ñeok 'o g ceoj.

The man is speaking.

Ñeok 'añ 'a:ñi.

I am speaking.

Pi 'ac ñeñok 'a:cim.

We are not speaking.

You can also match up the sentences with the words *cikpan* and *cickpan* with the two English sentences that are about *working*:

Pi 'o cickpan g cecoj.

The men are not working.

Cipkan 'añ 'a:ñi.

I am working.

That leaves the three longer sentences:

Ha-cecposid 'o g wakial g wipsilo.

Ceposid 'o g wakial g wisilo.

Pi 'o cepsid g wapkial g wisilo.

The cowboys are not branding the calf.

Which word means cowboy and which word means calf? You have already observed that a plural noun can be made by adding an extra letter (ceoj/cecoj, man/men). You also know that the plural noun cowboys occurs in Pi 'o cecposid g wapkial g wisilo. This might lead you to match up wapkial with wakial (Spanish vaquero) meaning cowboys/cowboy. Wisilo/wipsilo would then mean calf.

- |                                    |  |
|------------------------------------|--|
| Ha-cecposid 'o g wakial g wipsilo. | The cowboy is branding the calves.     |
| Ceposid 'o g wakial g wisilo.      | The cowboy is branding the calf.       |
| Pi 'o cecposid g wapkial g wisilo. | The cowboys are not branding the calf. |

The tricky part is that *ha-cecposid* (branding with reduplication of the initial *c*) doesn't go with the plural subject (cowboys), but with the plural object (calves).

## B2.

		Correct	Mistake
1.	Ha-cecposid 'o g wakial g wisilo. Brand-plural      cowboy    calf		X
2.	Cickpan 'añ 'a:ñi. Work-plural    I		X
3.	Cickpan 'ac 'a:cim Work-plural    we.	X	

The first sentence must be wrong because the verb contains the reduplicative *c*, but both nouns are singular. The second sentence is wrong because '*a:ñi* means *I* and is singular, but the verb contains the reduplicative *c*. The third sentence is correct.

## 11. First Revise the Linguistics Concept from IIITprep Book (REAP UGEE Part II) from [iiitprep.com](http://iiitprep.com)

**Appropriate Method 1: Alphabet Pattern (Encoding Decoding Question) From IIITprep REAP Book**

### Method 2: Exam Approach (Eliminating Options)

In C Part: P Stands for O or I but given that I Stands for D. It Contradicts so, p must stand for O only. --- [1]

In B Part: As it is given that H stands for A means from Option a [ ] [ ] is most proper So, only 1 Option Starting from a i.e., option 4. Tell us that V stands for R ----- [2]

In A part: We Know R -> O

V -> R

C -> N & G->?

[ ] ORN is Ans Matches with 2<sup>nd</sup> Option Only.

Means G must stand for B ----- [3]

Now for C Part: We have few words given in Encrypted Sentenced i.e.,

H -> A J -> E C -> N L -> S I -> D P -> O V -> R G -> B

GPVC -> BORN

BHI -> \_AD

LPBJ -> SO\_E

Form option in C We have B -> M or L

But for Meaningful Word, B must stand for M Not L so, B -> M

### Method 3: Exam Approach (Eliminating Options)

-> In the B part of the question only one option that is (d) are satisfies because h stands for a and in B part there is only one such option that is (d) are.

So, V -> R

J -> E

->In the C part looking at options we get that P must stand for either O or I. If P stands with I then In A part you will not be able to find answer as from the options of part A, P stands for either O or U, taking common from part A and C we get P->O

->In the A part we have to find for GPVC

Given C stands for N

Found V stands for R and P stands for O

So, we found the answer for part A that is GPVC->born (option b)

Here we found that G stands for b

Upto here we have solved for Part A and part B

Now for part C, LPBJ -> so\_e

We have to fill that space between o and e.

Now to make the given decrypted sentence a sensible meaning we arrive at the result that B -> M. So, answer of C part will be option A.

## 12. First Revise How to Solve Linguistic Question from IIITprep REAP Guide available on

iiitprep.com

First Understand its Language by Observation.

October is Repeated 3 times Similarly, the only word Repeated 3 Times is  
5<sup>th</sup> is Repeated 3 times. ----- [1]

Now Tuesday April is Repeated with Aprili Jumanne in 3 ,5 Sentence -----[2]

Now we have date 3 with December only, means in 1 only -----[3]

Now as with Aprili you have pili, nne for 2/4<sup>th</sup> -----[4]

Now with October in (2, 4, 6) doesn't matches with December means No Common in between October & December means, on left side it must be matched with F Sat. December coz, Sun is Common in Dec & Oct so it will Contradicts -----[5]

Now Here is Logic Observed in between date and Day.

1. Jumanne -> Tuesday coz last word nne means 4<sup>th</sup> -2 = 2 -----i.e., 2<sup>nd</sup> day of week
2. Jumantatu-> Monday coz, tatu means 3<sup>rd</sup> -2 = 1 -----i.e. 1<sup>st</sup> day of week
3. Jumatano ->? so, tano means 5<sup>th</sup> -2 = 3 -----i.e., 3<sup>rd</sup> day of week -----[6]

Now the puzzle Solved. Means

1. October -> Octoba && 5<sup>th</sup> -> tano -----from [1]
  2. April -> Aprili && Tuesday -> Jumanne -----from [2]
  3. December -> Disemba && 3<sup>rd</sup> -> tatu -----from [3]
  4. 2<sup>nd</sup> -> pili -----from [4] coz. Pili Matches with 8 option given below In Upper Question
  5. Saturday -> Jumamosi -----from [5]
  6. 4<sup>th</sup> -> nne -----from [4]
  7. Monday -> Jumatatu -----from Remaining data of October.
- So Now Get Answer

# IIITprep Result : UGEE 2021

UGEE  
AIR  
**4**



**NISHITA SINGH**  
2021 BATCH

UGEE AIR 4 HARSHVARDHAN 2021 BATCH	UGEE AIR 19 SAI MADHUSUDAN 2021 BATCH	UGEE AIR 20 BHAV BERI 2021 BATCH	UGEE AIR 29 KHUSHI WADHWA 2021 BATCH	UGEE AIR 43 BALABHADRA SAKETH 2021 BATCH
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99.5/150 RISHI AGRAWAL 2021 BATCH	99.5/150 GAGAN CHOPRA 2021 BATCH	99/150 ISHAN SINGH 2021 BATCH	98.5/150 ISHA NAYAR 2021 BATCH	98/150 MANRAJ SINGH CHAHAL 2021 BATCH

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96.5/150 	96/150 	95.5/150 	95.5/150 	95.5/150 	94.5/150 
94/150 	93.5/150 	93/150 	92.5/150 	92/150 	91.5/150 

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