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www.iitashram.com | Email:- iitashram.2011@gmail.com

KHOJ 2021

SAMPLE PAPER

ANSWER KEY WITH SOLUTION

Class 10

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PART – I : MENTAL ABILITY

Directions- Q1-Q2. Find the wrong term (s):

1. D4V, G10T, J20R, M43P, P90N

- (a) G10T (b) M43P (c) P90N (d) D4V,

Sol. (a)

First letter of every term is moved three steps forward in each next term. Second number of every term of the pattern $\times 2 + 1$, $\times 2 + 2$, $\times 2 + 3$ and third letter of every term is moved two steps backward. Hence, G10 T is the wrong term and should be replaced by G9T.

2. ABC, DGJ, HMR, NTA, SBK, ZKV

- (a) SBK, (b) ABC (c) NTA (d) HMR

Sol. (c)

First letter of first, second, third,..... terms is moved three, four, five steps forward respectively. Similarly, second letter is moved five, six, seven..... steps forward respectively and third letter is moved seven, eight, nine,..... steps forward respectively. Hence, NTA is the wrong term and should be replaced by MTA.

3. Five persons – P, Q, R, S and T, are standing in a queue. There are two persons between S and T. Q is standing in front of T. R is at the end of the queue. P is standing immediately behind S. Who is standing at the middle of the queue?

- (A) P (B) Q (C) S (D) T

Sol. Choice (B)

It is given that P is standing immediately behind S.

So, S

P There are two persons between S and T,

Therefore, it has to be either

S T

- -

T S

It is also given that R is at the end of queue. Combining the above three conditions, we can get the following order SPQTR. So, Q is in the middle of the row.

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4. Pointing towards a man in the photograph, Archana said, "He is the son of the only son of my grandmothers. How is man related to Archana ?

- (A) Cousin (B) Nephew (C) Brother (D) Son

Sol. (C)

Only son of Archana's grandfather means Archana's father & his son is Archana's brother

Directions: (5 to 7)

Read the following information carefully and answer the questions given below.

(i) P, Q, R, S, T and U are six members of a family, each of them engaged in a different profession

Doctor, Lawyer, Teacher, Engineer, Nurse, Manager

(ii) Each of them remains at home at on a different day of the week from Monday to Saturday.

(iii) The Lawyer in the family remains at home on Thursday.

(iv) R remains at home on Tuesday.

(v) P, the Doctor does not remain at home either on Saturday or on Wednesday

(vi) S is neither the Doctor nor the teacher and remains at home on Friday

(vii) Q is the Engineer and T is the Manager

5. Which of the following combinations is correct?

- (A) Lawyer - Tuesday (B) Teacher - Wednesday
(C) Manager - Friday (D) Nurse - Friday

6. Who is the nurse?

- (A) S (B) R (C) U (D) Data inadequate

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7. Who remains at home on Saturday?

- (A) S (B) T (C) R (D) Data inadequate

Sol. (5 to 7) clearly the arrangement is as shown:

Person	Day	Profession
P	Monday	Doctor
Q	Wednesday/Saturday.	Engineer
R	Tuesday	Teacher
S	Friday	Nurse
T	Wednesday/Saturday.	Manager
U	Thursday	Lawyer

Sol. 5 (D) Clearly combinations Nurse-Friday is correct

Sol. 6 (A) Clearly S is a nurse

Sol.7 (D) Clearly we can not exactly tell who remain at home on Saturday.

8. **Which** Calendar year for 1995 will serve same calendar for 2006 from the following years?

- (A) 2009 (B) 2005 (C) 2008 (D) 2006

Sol. (d)

The Calendar for 1995 and 2006 will be the same if day on 1st January of both the years is the same.

This is possible only if the total odd days between 31st Dec. 1994 and 31st Dec.2005 is 0. [one day before both the years as we want to know the day on 1st January of both the years i.e. same]

During this period, we have

3 leap years and 08 ordinary years

(1996,2000,2004)

(1995, 1997, 1998, 1999, 2001, 2002, 2003, 2005)

Total odd days = $(2 \times 3 + 1 \times 8) = 14 = 0$ odd days

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Directions (9 to 10) In each of the following questions, there is a certain relation between two given number on one side of: : and one number is given on another side of: : while another number is to be found from the given alternatives, having the same relation with this number as the numbers of the given pair bear Choose the best alternative.

9 7584:4251:: 4673:?

- (A) 1367 (B) 1340 (C) 1531 (D) None of these

Sol. (B) The relationship is $x : (x - 3333)$

10 225 : 257 : : 289 : ?

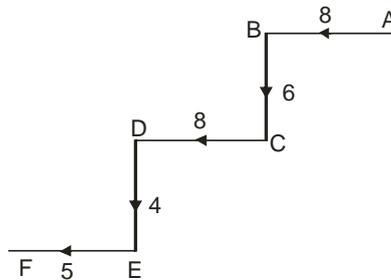
- (A) 301 (B) 316 (C) 320 (D) 325

Sol. (D) The relationship is $x^2 : (x + 1)^2 + 1$

11. A person starts from his house and travels 8 m towards west; then he travels 6 m towards his left, then 8 m towards west and then 4 m towards south. Finally, he turns right and travels 5 m. What is the horizontal distance traveled by him?

- (A) 30 (B) 16 (c) 21 (D) 25

Sol. (c)



Let A and F be the initial and the final positions.

Horizontal distance traveled = FE + DC + BA = 5 + 8 + 8 = 21 m.

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12 Given that: $>$ denotes $+$, $<$ denotes $-$, \div denotes \div , $=$ denotes 'less than' and \times denotes 'greater than', find which of the following is a correct statement.

(A) $3 + 2 > 4 = 9 + 3 < 1$

(B) $3 > 2 > 4 = 18 + 3 < 2$

(C) $3 > 2 < 4 \times 8 + 4 < 2$

(D) $3 + 2 < 4 \times 9 + 3 < 3$

Sol. (C) Using proper notations, we have

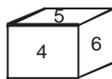
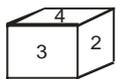
(a) given statement is $3, 2 + 4 < 9 \div 3 - 1$ or $\frac{11}{2} < 2$, which is not true

(b) given statement is $3 + 2 + 4 < 18, 3 - 2$ or $9 < 4$, which is not true.

(c) given statement is $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true.

(d) given statement is $3, 2 - 4 > 9 \div 3 - 3$ or $\frac{5}{2} > 0$, which is not true.

13. The figures given below show the two different positions of a dice. Which number will appear opposite to number 2.



(i)

(ii)

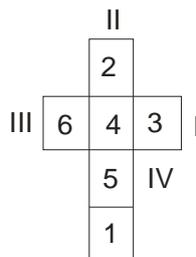
(A) 3

(B) 4

(C) 5

(D) 6

Sol. (c) The above question, where only two positions of a dice are given, can easily be solved with the following method.



Step I. The dice, when unfolded, will appear as shown in the figure given on the right side.

Step II. Write the common number to both the dice in the middle block. Since common number is 4, hence number 4 will appear in the central block.

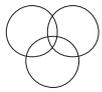
Step III. Consider the figure (i) and write the first number in the anti-clockwise direction of number 4, (common number) in block I and second number in block II. Therefore, numbers 3 and 2 being the first and second number to 4 in anticlockwise directions respectively will appear in block I & II respectively.

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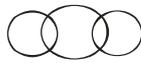
Step IV. Consider figure (ii) and write first and second number in the anti clock-wise direction to number 4, (common number) in block (III) & (IV). Hence numbers 6 and 5 will appear in the blocks III and IV respectively.

Step V. Write remaining number in the remaining block. Therefore, number 1 will come in the remaining block. Now, from the unfolded figures we find that number opposite to 6 is 3, number opposite to 2 is 5 and number opposite to 4 is 1. Therefore, option (c) is our answer

14. Which of the following diagrams correctly represents the relationship among Tennis fans, Cricket players and Students.



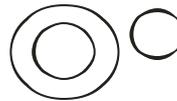
(A)



(B)



(C)



(D)

Sol. (A) From the relationship given in the question, we observe that each of the objects carries something in common to one another. A Tennis fan can be a cricket player as well as student. Hence Diagram (A) represents this relationship.

PART – II : MATHEMATICS

1. A rectangular sheet of paper 44 cm × 18 cm is rolled along its length and a cylinder is formed. The volume the cylinder so formed is equal to (Take $\pi = \frac{22}{7}$)

(a) 2772 cm³ (b) 2505 cm³ (c) 2460 cm³ (d) 2672 cm³

SOL. (a) Length of the sheet = circumference of cylinder base

$$2 \times \pi \times r = 44\text{cm}$$

$$2 \times \frac{22}{7} \times r = 44$$

$$R = \left(\frac{44}{7} \times \frac{7}{22} \right)$$

$$R = 7\text{cm}$$

therefore

$$\text{cylinder radius} = r = 7\text{cm}$$

height of the cylinder = breadth of the rectangle

$$h = 18\text{cm}$$

$$\text{volume of the cylinder} = \pi \times r^2 \times h = \frac{22}{7} \times 7 \times 7 \times 18 = 22 \times 7 \times 18 = 2772 \text{ cm}^3$$

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2. Let a_1, a_2, \dots and b_1, b_2, \dots be the arithmetic progressions such that $a_1 = 25$ and $b_1 = 75$ and $a_{100} + b_{100} = 100$. Find the sum of the first one hundred terms of the progression. $(a_1 + b_1), (a_2 + b_2), \dots$. Is
- (a) 0 (b) 100 (c) 10,000 (d) 505,000

Sol. (c) Given there are two A.P's

a_1, a_2, \dots and b_1, b_2, b_3, \dots

Also given that $a_1 = 25$ and $b_1 = 75$

And the sum of 100th term of both the A.P is $a_{100} + b_{100} = 100$

Given a new A.P:

$(a_1 + b_1), (a_2 + b_2), (a_3 + b_3), \dots, (a_{100} + b_{100})$

$$\therefore a_1 + b_1 = 25 + 75 = 100$$

And the last term is $a_{100} + b_{100} = 100$

$$\therefore S_n = \frac{n}{2} \times (\text{first term} + \text{last term}) = 50 \times (100 + 100) = 10000$$

3. **The least number which when divided by 2, 3, 4, 5 and 6 leaves the remainder 1 in each case. If the same number is divided by 7 it leaves no remainder. The number is**

(a) 231 (b) 301 (c) 371 (d) 441

Sol. (B)

The least common multiple of 2, 3, 4, 5, 6 is their LCM=60.

So, the answer is the least number such that it is a multiple of 7 and a multiple of 60 leaving remainder 1.

\therefore The required answer is 301.

4. **The cross-section of a canal is a trapezium in shape. If the canal is 8m wide at the top and 6 m wide at the bottom and the area of cross-section is 644 sq m, then the length of the canal is**

(a) 90 m (b) 92 m (c) 94 m (d) 96 m

Sol. (b) If h is the length, then by hypothesis

$$12(8 + 6) \times h = 644$$

$$\text{Or } 7h = 644$$

$$h = 92\text{m}$$

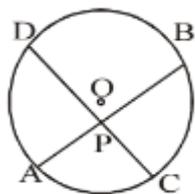
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5. Which of the following is true –

- (A) Mode = 2median + Mean (B) Median = Mode + $\frac{3}{2}$ [Mean – Median]
(C) Mean = Mode + $\frac{3}{2}$ [Median – Mode] (D) Median = Mode + $\frac{3}{2}$ [Mean + Median]

SOL: (C)

6. In the given figure, AP = 2 cm, BP = 6 cm and CP = 3 cm. Find DP :



- a) 6 cm b) 4 cm c) 2 cm d) 3 cm

Sol. (b) $AP \times BP = PC \times DP$
 $2 \times 6 = 3 \times DP$
 $12 = 3DP$
 $DP = 12/3$
 $DP = 4\text{cm}$

7. Two circles touch each other internally. Their radii are 2 cm and 3 cm. The biggest chord of the other circle which is outside the inner circle, is of length :

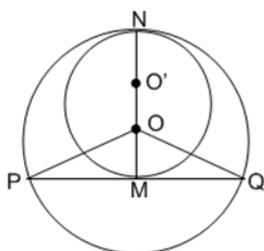
- (A) $2\sqrt{2}\text{ cm}$ (B) $3\sqrt{2}\text{ cm}$ (C) $2\sqrt{3}\text{ cm}$ (D) $4\sqrt{2}\text{ cm}$

Sol : (d)

From the figure

MN is the diameter of the smaller circle and PQ is the biggest chord of the greater circle. O is the centre of the greatest circle and O' is the centre of the inner circle.

Now,



$$OM = MN - ON = 4 - 3 = 1\text{m}$$

Now, ΔPMO

$$PM = \sqrt{OP^2 - OM^2} = \sqrt{(3)^2 - (1)^2} = \sqrt{9 - 1} = \sqrt{8} = 2\sqrt{2} \text{ cm}$$

$$\therefore PQ = 2 \times 2\sqrt{2} = 4\sqrt{2} \text{ cm}$$

8. If $\tan A + \cot A = 4$, then $\tan^4 A + \cot^4 A$ is equal to :

(A) 110

(B) 191

(C) 80

(D) 194

Sol. (d) Given Equation is $\tan A + \cot A = 4$.

On squaring both sides, we get

$$= > (\tan A + \cot A)^2 = (4)^2$$

$$= > \tan^2 A + \cot^2 A + 2 \tan A \cot A = 16$$

$$= > \tan^2 A + \cot^2 A + 2 \times \tan A \times (1/\tan A) = 16$$

$$= > \tan^2 A + \cot^2 A + 2 = 16$$

$$= > \tan^2 A + \cot^2 A = 16 - 2$$

$$= > \tan^2 A + \cot^2 A = 14.$$

On squaring both sides, we get

$$= > (\tan^2 A + \cot^2 A)^2 = (14)^2$$

$$= > \tan^4 A + \cot^4 A + 2 \times \tan^4 A \times \cot^4 A = 196$$

$$= > \tan^4 A + \cot^4 A + 2 \times \tan^4 A \times (1/\tan^4 A) = 196$$

$$= > \tan^4 A + \cot^4 A + 2 = 196$$

$$= > \tan^4 A + \cot^4 A = 196 - 2$$

$$= > \tan^4 A + \cot^4 A = 194$$

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9. A railway half ticket costs half the full fare and the reservation charge is the same o half ticket as on full ticket. One reserved first class ticket from Mumbai to Ahmedabad costs Rs 216 and one full and one half reserved first class tickets cost Rs. 327. What is the basic first class full fare and what is the reservation charge ?

- a) Rs5 b) Rs 6 c) Rs 7 d) Rs 8

Sol (b)

Let the cost of fare be Rs.'x' and the reservation charge be Rs.'y'.

By condition I : $x + y = 216$ (i)

By condition II:

one full and one half ticket $1 + \frac{1}{2} = \frac{3}{2}$

cost of half railway ticket is $= \frac{x}{2}$

$\therefore, x + y + \frac{x}{2} + y = 327 \quad \Rightarrow \quad 23x + 2y = 327$

$\Rightarrow \quad 3x + 4y = 654 \quad \dots(ii) \quad \text{(after multiplying by 2)}$

By solving (i) and (ii) we will get

$3x + 4y - 4x - 4y = 654 - 864$

$\therefore \quad x = 210$ and put $x = 210$ in (i) we get $y = 216 - x = 216 - 210 = 6$

$\therefore \quad y = 6$

Hence, basic fare for one ticket is Rs.210 and reservation fare is Rs.6

10. In the figure AD is the external bisector of $\angle EAC$, intersects BC produced to D. If $AB = 12$ cm, $AC = 8$ cm and $BC = 4$ cm, find CD.

- (A) 10 cm (B) 6 cm (C) 8 cm (D) 9 cm

Sol. (c) Using the exterior angle bisector theorem, we get:

$\frac{BD}{CD} = \frac{AB}{AC} \Rightarrow \frac{BC + CD}{CD} = \frac{AB}{AC} \Rightarrow \frac{4 + CD}{CD} = \frac{12}{8} \Rightarrow \frac{4}{CD} + 1 = \frac{3}{2}$

$\Rightarrow \frac{4}{CD} = \frac{1}{2} \quad \Rightarrow \quad CD = 8\text{cm}$

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11. In a single throw of two dice , getting a multiple of two on one die and a multiple of three on the other is

- (A) $\frac{15}{36}$ (B) $\frac{25}{36}$ (C) $\frac{11}{36}$ (D) $\frac{5}{6}$

Sol : (c)

Case 1- when dice 1 is getting a multiple of two and dice 2 is getting multiple of 3. so in this case , combination will be- $p(a) = (2,3) , (2,6) , (4,3) , (4,6) , (6,3) , (6,6) =$ Six way

case 2- when dice 2 is getting a multiple of two and dice 1 is getting multiple of 3. so in this case , combination will be- $p(b) = (3,2) , (6,2) , (3,4) , (6,4) , (3,6) , (6,6) =$ Six way

$p(a \cap b) = (6,6) = 1$ way total no of chances = $p(a) + p(b) - p(a \cap b) = 11$

total operation = $6 * 6 = 36$

hence probability = $11/36$

12. If $\sin x + \sin^2 x = 1$, then $\cos^8 x + 2\cos^6 x + \cos^4 x$ is equal to :

- (A) 0 (B) -1 (C) 2 (D) 1

Sol: (d)

$$\sin x + \sin^2 x = 1$$

$$\sin x = 1 - \sin^2 x$$

$$\sin x = \cos^2 x$$

$$\sin^2 x = \cos^4 x$$

$$\text{so, } \cos^8 x + 2\cos^6 x + \cos^4 x$$

$$= \cos^4 x (\cos^4 x + 2 \cos^2 x + 1) = \sin^2 x (\sin^2 x + 2 \sin x + 1)$$

$$= \sin^4 x + 2 \sin^3 x + \sin^2 x = \sin^4 x + \sin^3 x + \sin^3 x + \sin^2 x$$

$$= \sin^2 x (\sin^2 x + \sin x) + \sin x (\sin^2 x + \sin x)$$

$$= \sin^2 x \times (1) + \sin x (1) = \sin^2 x + \sin x = 1$$

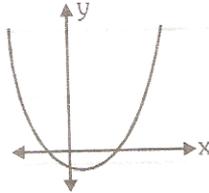
13. The three sides of a triangles are given. Which one of the following is not a right triangle ?

- (A) 20, 21, 29 (B) 16, 63, 65
(C) 56, 90, 106 (D) 36, 35, 74

Sol (d) By applying Pythagoras theorem.

14. Graph of $y = ax^2 + bx + c$ is given adjacently. What conclusions can be drawn from the graph :

- (i) $a > 0$ (ii) $b < 0$ (iii) $c < 0$ (iv) $b^2 - 4ac > 0$



- (A) (i) and (iv) (B) (ii) and (iii) (C) (i), (ii) & (iv) (D) (i), (ii), (iii) & (iv)

SOL : (D) Since parabola is upward $a > 0$

Curve is crossing x-axis at two points \Rightarrow roots are real $\Rightarrow b^2 - 4a > 0$

Roots are of opposite signs $c/a < 0 \Rightarrow c < 0$

Also magnitude of +ve root is larger \Rightarrow sum of roots > 0

$\Rightarrow -b/a > 0 \Rightarrow b < 0$

Hence all the options are correct.

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PART – III : PHYSICS/CHEMISTRY

1. A charge q_1 exerts some force on a second charge q_2 . If third charge q_3 is brought near, the force of q_1 exerted on q_2
- (a) Decreases
 - (b) Increases
 - (c) Remains unchanged
 - (d) Increases if q_3 is of the same sign as q_1 and decreases if q_3 is of opposite sign

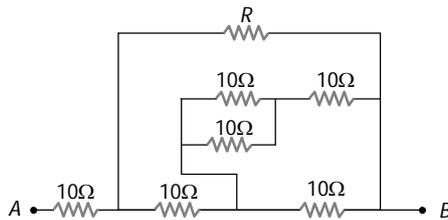
Sol. (c) The force will still remain same

2. The resistance of a wire is R . If the length of the wire is doubled by stretching, then the new resistance will be
- (a) $2R$
 - (b) $4R$
 - (c) R
 - (d) $\frac{R}{4}$

Sol. (b) $R \propto l^2 \Rightarrow$ If l doubled then R becomes 4 times.

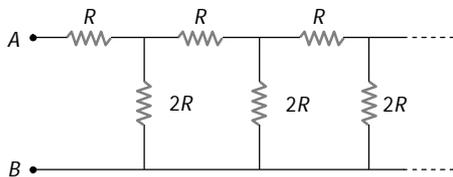
3. For what value of R the net resistance of the circuit will be 18 ohms

- (a) 8Ω
- (b) 10Ω
- (c) 16Ω
- (d) 24Ω



Sol. (c)

4. An infinite ladder network is arranged with resistances R and $2R$ as shown. The effective resistance between terminals A and B is

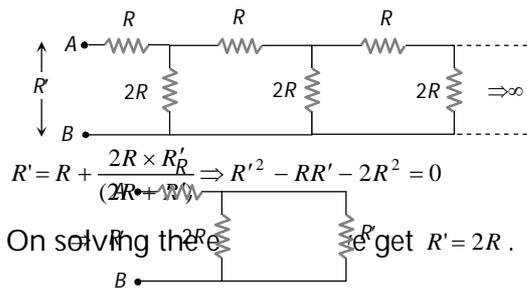


- (a) ∞
- (b) R
- (c) $2R$
- (d) $3R$

Sol. (c)

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Let equivalent resistance between A and B is R' , so given circuit can be reduced as follows



5. If two bulbs of wattage 25 and 30, each rated at 220 volts, are connected in series with a 440 volt supply, which bulb will fuse
- (a) 25 W bulb (b) 30 W bulb (c) Neither of them (d) Both of them

Sol. (a) In series, $P_{Consumed} \propto \frac{1}{P_{Rated}} \propto V_{Applied}$

i.e. more voltage appears on smaller wattage bulb, so 25 W bulb will fuse

6. A man runs towards mirror at a speed of 15 m/s. What is the speed of his image
- (a) 7.5 m/s (b) 15 m/s (c) 30 m/s (d) 45 m/s

Sol. (b)

7. In a concave mirror experiment, an object is placed at a distance x_1 from the focus and the image is formed at a distance x_2 from the focus. The focal length of the mirror would be

- (a) $x_1 x_2$ (b) $\sqrt{x_1 x_2}$ (c) $\frac{x_1 + x_2}{2}$ (d) $\sqrt{\frac{x_1}{x_2}}$

Sol. (b) Given $u = (f + x_1)$ and $v = (f + x_2)$

The focal length $f = \frac{uv}{u+v} = \frac{(f+x_1)(f+x_2)}{(f+x_1)+(f+x_2)}$

On solving, we get $f^2 = x_1 x_2$ or $f = \sqrt{x_1 x_2}$

8. The wavelength of light in two liquids 'x' and 'y' is 3500 Å and 7000 Å, then the critical angle of x relative to y will be

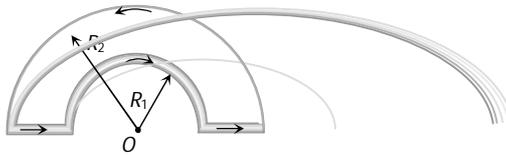
- (a) 60° (b) 45° (c) 30° (d) 15°

Sol. (c) The critical angle C is given by

$$\sin C = \frac{n_2}{n_1} = \frac{\lambda_1}{\lambda_2} = \frac{3500}{7000} = \frac{1}{2} \Rightarrow C = 30^\circ$$

9. The magnetic induction at the centre O in the figure shown is

- (a) $\frac{\mu_0 i}{4} \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$
- (b) $\frac{\mu_0 i}{4} \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$
- (c) $\frac{\mu_0 i}{4} (R_1 - R_2)$
- (d) $\frac{\mu_0 i}{4} (R_1 + R_2)$



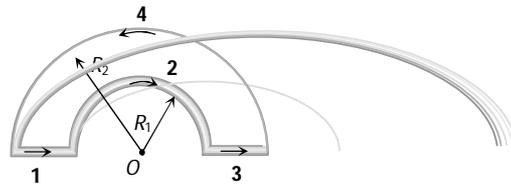
Sol. (a) In the following figure, magnetic fields at O due to sections 1, 2, 3 and 4 are considered as B_1, B_2, B_3 and B_4 respectively.

$$B_1 = B_3 = 0$$

$$B_2 = \frac{\mu_0}{4\pi} \cdot \frac{\pi i}{R_1} \otimes$$

$$B_4 = \frac{\mu_0}{4\pi} \cdot \frac{\pi i}{R_2} \odot \quad \text{As } |B_2| > |B_4|$$

$$\text{So } B_{net} = B_2 - B_4 \Rightarrow B_{net} = \frac{\mu_0 i}{4} \left(\frac{1}{R_1} - \frac{1}{R_2} \right) \otimes$$



10. Two parallel conductors A and B of equal lengths carry currents I and $10 I$, respectively, in the same direction. Then

- (a) A and B will repel each other with same force
- (b) A and B will attract each other with same force
- (c) A will attract B , but B will repel A
- (d) A and B will attract each other with different forces

Sol. (b) By Fleming left hand rule.

11. The working of dynamo is based on principle of

- (a) Electromagnetic induction
- (b) Conversion of energy into electricity
- (c) Magnetic effects of current
- (d) Heating effects of current

Sol. (a)

Rotation of magnet in the dynamo creates the variable flux which in turn produces the induced current.

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12. A convex mirror of focal length f (in air) is immersed in a liquid $\left(\mu = \frac{4}{3}\right)$. The focal length of the mirror in liquid will be:

- (A) $\left(\frac{3}{4}\right)f$ (B) $\left(\frac{4}{3}\right)f$ (C) f (D) $\left(\frac{7}{3}\right)f$

Sol. (C)

13. Primary pigments are :

- (A) Red, Blue, Yellow (B) Red, Cyan, Magenta
(C) Yellow, Cyan, Magenta (D) Blue, Cyan, Magnet

Sol. (C) Yellow, Cyan, Magenta

14. The place where nuclear power plant is not situated is :

- (A) narora (B) Tarapur (C) Kota (D) Bhopal

Sol. (D)

15.. When Fe is rusted then Fe is

- (a) Oxidised (b) Reduced (c) Hydrolysed (d) Precipitated

Sol. (a) When Fe is rusted it is Oxidised.

16. Oxidation of which of the following element is not possible

- (a) F (b) Cl (c) Br (d) I

Sol. (a) Oxidation of Fluorine is not possible.

17. Aqua Regia means

- (a) Hard water (b) Heavy water (c) Royal water (d) Soft water

Sol. (c) Aqua regia also known as royal water.

18. Acid with Unit concentration has pH

- (a) Zero (b) One (c) Seven (d) Fourteen

Sol. (a) Acid with Unit concentration have pH equal to Zero.

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25. Basicity of Acetic acid is

- (a) 1 (b) 2 (c) 3 (d) 4

Sol. (a) Acetic acid have only one ionisable hydrogen so Basicity 1.

26. Sting of wasp is

- (a) Acidic (b) Basic (c) Neutral (d) None of these

Sol. (b) Sting of wasp is basic in nature.

27. Carbon is present in group number

- (a) 13 (b) 14 (c) 15 (d) 18

Sol. (b) Carbon is present group number 14.

28. The percentage of Carbon in Earth crust is

- (a) 0.02 % (b) 0.03% (c) 0.04% (d) 0.05%

Sol. (a) The percentage of Carbon in Earth crust is 0.02%

PART – IV : BIOLOGY

1. Excess salt inhibits bacterial growth in pickles by :-

- (a) endosmosis (b) exosmosis (c) oxidation (d) denaturation

Ans. (b)

2. Restriction endonucleases are enzymes that are used by biotechnologists to :-

- (a) cut DNA at specific base sequences (b) join fragments of DNA
(c) digest DNA from the 3' end (d) digest DNA from the 5' end

Ans. (a)

3. Enzyme X extracted from the digestive system hydrolyses peptide bonds. Which of the following are probable candidates to be enzyme X :-

- (a) Amylase (b) Lipase (c) Trypsin (d) Maltase

Ans. (c)

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4. A person with blood group AB has :-
- (a) antigen A and B on RBCs and both anti-A and anti-B antibodies in plasma
 - (b) antigen A and B on RBCs but neither anti-A nor anti-B antibodies in plasma
 - (c) no antigen on RBCs but both anti-A and anti-B antibodies present in plasma
 - (d) antigen A on RBCs and anti-B antibodies in plasma

Ans. (b)

5. Glycolysis is the breakdown of glucose to pyruvic acid. How many molecules of pyruvic acid are formed from one molecule of glucose :-

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans. (b)

6. The process of transfer of electrons from glucose to molecular oxygen in bacteria and mitochondria is known as :-

- (a) TCA cycle
- (b) Oxidative phosphorylation
- (c) Fermentation
- (d) Glycolysis

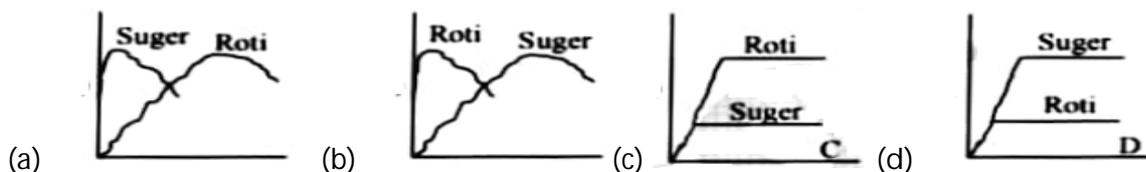
Ans. (b)

7. Considering the average molecular mass of a base to be 500 Da, what is the molecular mass of a double stranded DNA of 10 base pairs :-

- (a) 500 Da
- (b) 5 kDa
- (c) 10 kDa
- (d) 1 kDa

Ans. (c)

8. Which of the following graphs accurately represents the insulin levels (Y-axis) in the body as a function of time (X-axis) after eating sugar and bread/roti?



Ans. (a)

9. You marked two ink-spots along the height at the base of a coconut tree and also at the top of the tree. When you examine the spots next year when the tree has grown taller, you will see-

- (a) the two spots at the top have grown more apart than the two spots at the bottom
- (b) the top two spots have grown less apart than the bottom two spots
- (c) both sets of spots have grown apart to the same extent
- (d) both sets of spots remain un-altered

Ans. (a)

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10. The amino acid sequences of a bacterial protein and a human protein carrying out similar function are found to be 60% identical. However the DNA sequences of the genes coding for these proteins are only 45% identical. This is possible because-

- (a) Protein sequence does not depend on DNA sequence
- (b) DNA codons having different nucleotides in the third position can code for the same amino acids
- (c) DNA codons having different nucleotides in the second position can code for the same amino acids
- (d) Same DNA codons can code for multiple amino acids

Ans. (b)

11. Which gas does not produces green house effect

- (a) Carbondioxide
- (b) Methane
- (c) Hydrogen
- (d) Chloro-Fluro-Carbon

Ans. (c)

Sol. Carbondioxide, Methane & Chloro-Fluro-Carbon are Green house gases.

12. 'The Ganga Action Plan' was started in the-

- (a) 1980
- (b) 1986
- (c) 1960
- (d) 1970

Ans. (b)

13. Deficiency of Vitamine 'C' causes-

- (a) Beriberi
- (b) Night blindness
- (c) Blue eyes
- (d) Scurvy

Ans. (d)

Sol. Vitamin C deficiency cause Scurvy

14. Fat is completely digested in the-

- (a) Stomach
- (b) Mouth
- (c) Small intestine
- (d) Large intestine

Ans. (c)

Sol. In small intestine duodenum recives bile juice & pancreatic juice which help in fat digestion.