

# National Testing Agency

**Question Paper Name :** UIQP01 23rd Sep 2021 Shift 1  
**Subject Name :** UIQP01  
**Creation Date :** 2021-09-23 17:40:19  
**Duration :** 120  
**Total Marks :** 400  
**Display Marks:** Yes

## UIQP01

**Group Number :** 1  
**Group Id :** 864351330  
**Group Maximum Duration :** 0  
**Group Minimum Duration :** 120  
**Show Attended Group? :** No  
**Edit Attended Group? :** No  
**Break time :** 0  
**Group Marks :** 400  
**Is this Group for Examiner? :** No

## Part A General Paper

**Section Id :** 8643511202  
**Section Number :** 1  
**Section type :** Online

**Mandatory or Optional :**

Mandatory



**Number of Questions :** 25  
**Number of Questions to be attempted :** 25  
**Section Marks :** 100  
**Enable Mark as Answered Mark for Review and Clear Response :** Yes  
**Sub-Section Number :** 1  
**Sub-Section Id :** 8643511435  
**Question Shuffling Allowed :** Yes

**Question Number : 1 Question Id : 86435128705 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Choose the word opposite in meaning to the underlined word in the following sentence :

The leader had a derisive attitude towards some of the members of his team.

1. Respectful
2. Negative
3. Deprecatory
4. Critical

**Options :**

86435199271. 1

86435199272. 2

86435199273. 3

86435199274. 4

**Question Number : 2 Question Id : 86435128706 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**

Choose the word that best fits into the blank space of the following sentence :

Ambition is one of those \_\_\_\_\_ which are never satisfied.

1. ideas
2. activities
3. fancies
4. passions

**Options :**

86435199275. 1

86435199276. 2

86435199277. 3

86435199278. 4

**Question Number : 3 Question Id : 86435128707 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Monika is not \_\_\_\_\_ for this kind of a job.

1. cut up
2. cut in
3. cut out
4. cut through

**Options :**

86435199279. 1

86435199280. 2

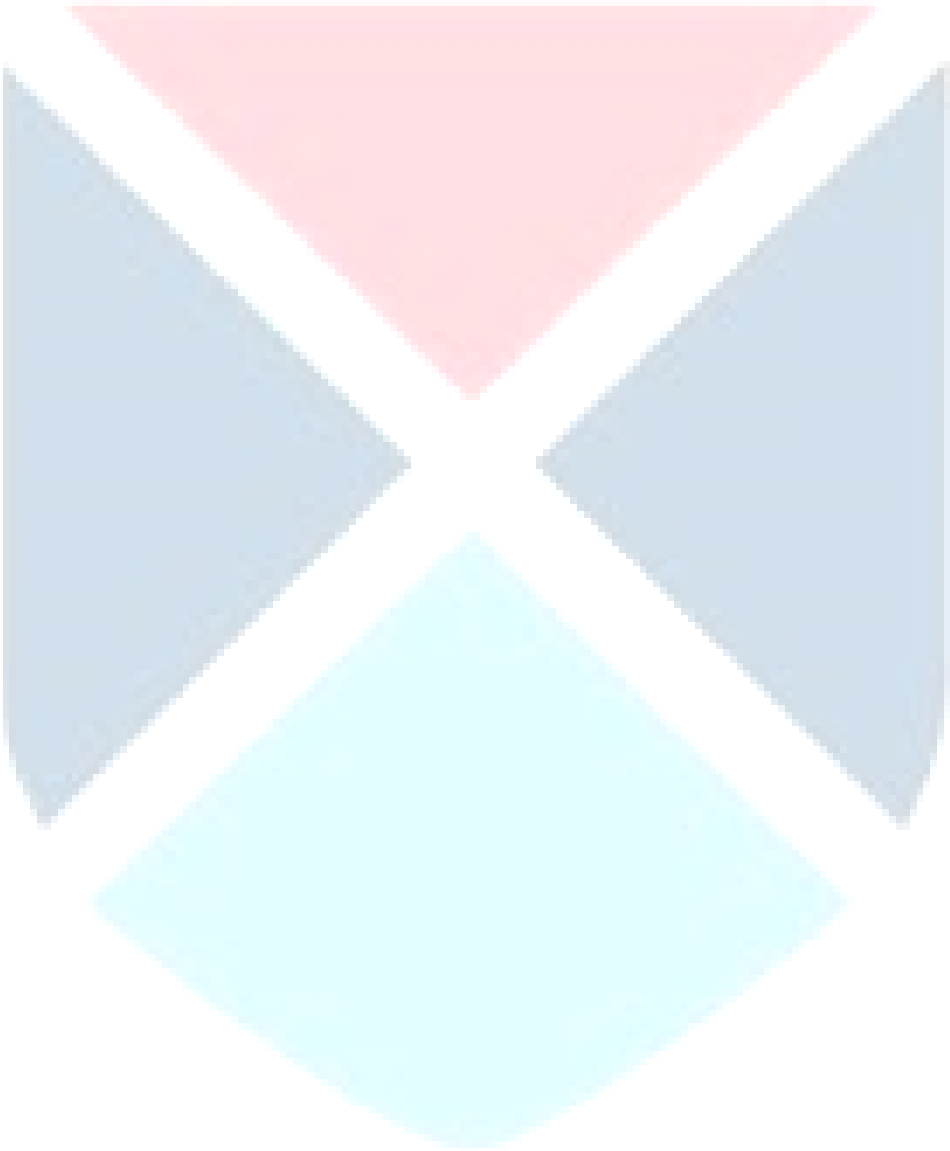
86435199281. 3

86435199282. 4

**Question Number : 4 Question Id : 86435128708 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Ramesh decided to set \_\_\_\_\_ sometime everyday for gardening.

1. up
2. of
3. on
4. aside

**Options :**

86435199283. 1

86435199284. 2

86435199285. 3

86435199286. 4

**Question Number : 5 Question Id : 86435128709 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Get me a cup of coffee, \_\_\_\_\_

1. shall you?
2. will you?
3. won't you?
4. wouldn't you?

**Options :**

86435199287. 1

86435199288. 2

86435199289. 3

86435199290. 4

**Question Number : 6 Question Id : 86435128710 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

She took that person \_\_\_\_\_ a thief.

1. to
2. as
3. for
4. after

**Options :**

86435199291. 1

86435199292. 2

86435199293. 3

86435199294. 4

**Question Number : 7 Question Id : 86435128711 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

As the *Ratha Yatra* festival approaches, the number of pilgrims in Puri \_\_\_\_\_.

1. increases
2. is increasing
3. will be increased
4. would have been increased

**Options :**

86435199295. 1

86435199296. 2

86435199297. 3

86435199298. 4

**Question Number : 8 Question Id : 86435128712 Question Type : MCQ Option Shuffling : No Is**

**Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If you suffer from fever, the best remedy lies \_\_\_\_\_ complete rest.

1. with
2. in
3. on
4. upon

**Options :**

86435199299. 1

86435199300. 2

86435199301. 3

86435199302. 4

**Question Number : 9 Question Id : 86435128713 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Choose the word that best fits into the blank space of the following sentence :

Education facilitates the \_\_\_\_\_ of specific skills.

1. creation
2. procurement
3. acquisition
4. requirement

**Options :**

86435199303. 1

86435199304. 2

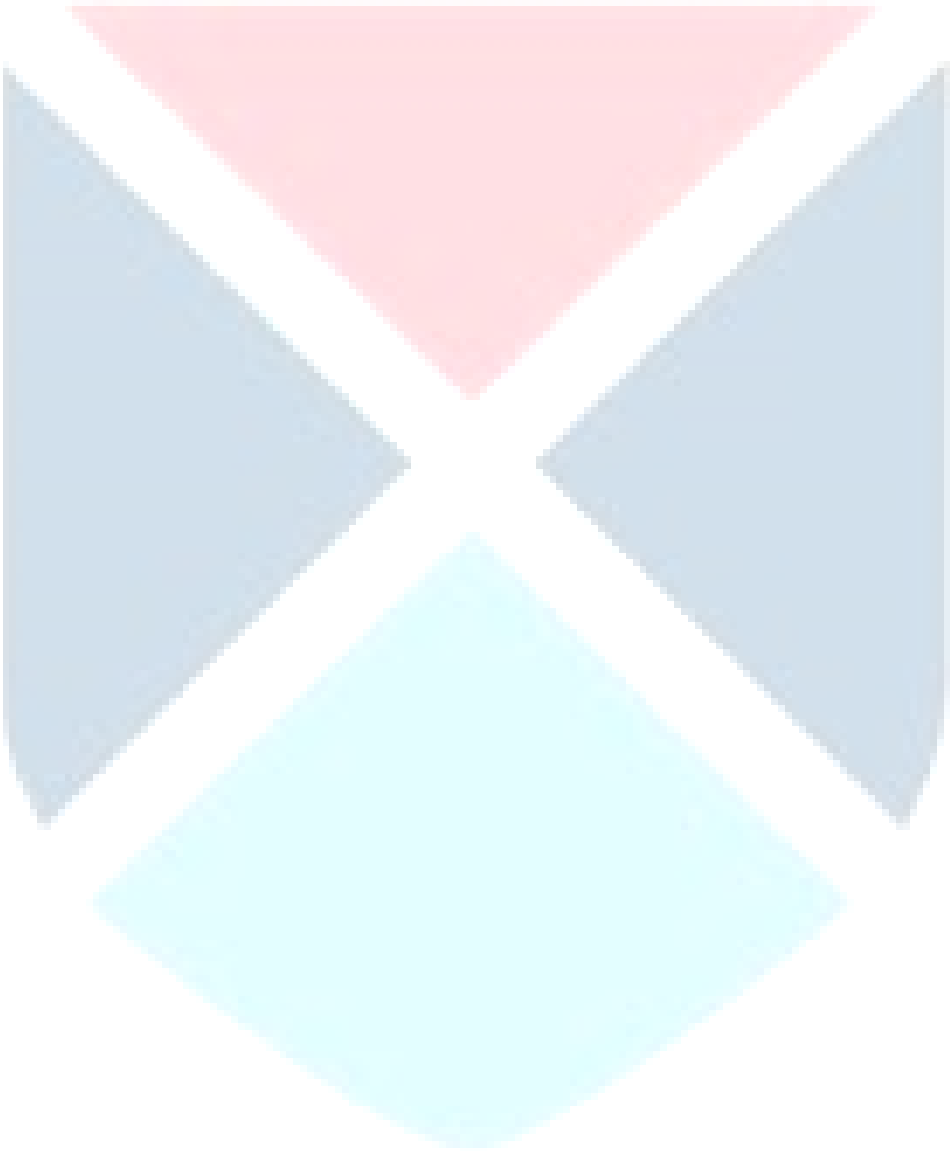
86435199305. 3

86435199306. 4

**Question Number : 10 Question Id : 86435128714 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**



The book has passed \_\_\_\_\_ fifteen editions.

1. by
2. on
3. from
4. through

**Options :**

86435199307. 1

86435199308. 2

86435199309. 3

86435199310. 4

**Question Number : 11 Question Id : 86435128715 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Amit and Bobby are brothers. Chitransha and Dolly are sisters. Amit's son is Dolly's brother. How is Bobby related to Chitransha?

1. Father
2. Uncle
3. Grandfather
4. Brother

**Options :**

86435199311. 1

86435199312. 2

86435199313. 3

86435199314. 4

**Question Number : 12 Question Id : 86435128716 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Three of the following are alike in a certain way and therefore, form a group.  
Which is the one that does not belong to that group?

1. Snail
2. Tortoise
3. Spider
4. Turtle

**Options :**

86435199315. 1

86435199316. 2

86435199317. 3

86435199318. 4

**Question Number : 13 Question Id : 86435128717 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

What number will come in the blank in the following number series?

13, 14, 22, 31, \_\_\_\_\_, 120, 336

1. 35
2. 45
3. 65
4. 95

**Options :**

86435199319. 1

86435199320. 2

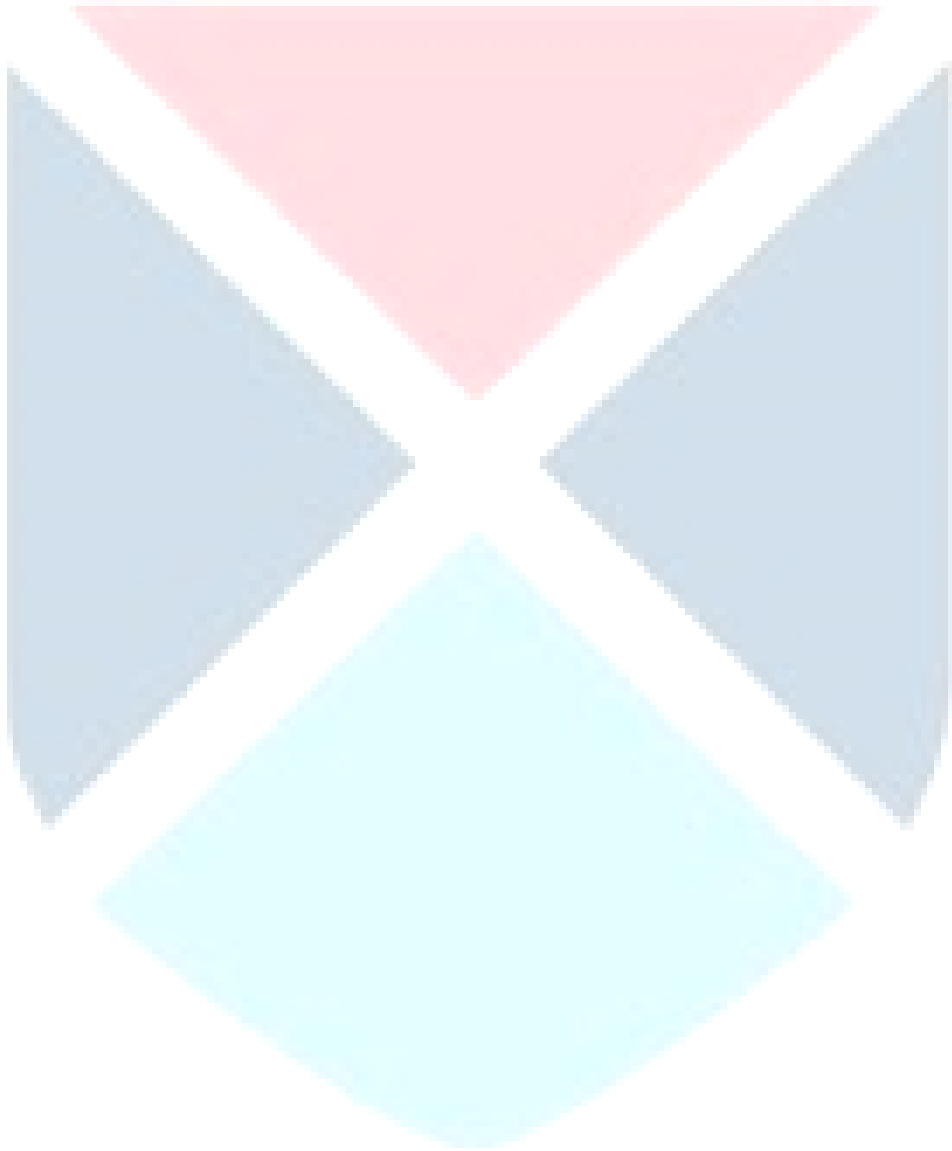
86435199321. 3

86435199322. 4

**Question Number : 14 Question Id : 86435128718 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



21 workers can make 1500 breads in 18 days. How many workers are required to make 1000 breads in 21 days?

1. 10
2. 12
3. 15
4. 16

**Options :**

86435199323. 1

86435199324. 2

86435199325. 3

86435199326. 4

**Question Number : 15 Question Id : 86435128719 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A bus covers the first 39 km of its journey in 45 minutes and the remaining 25 km in 35 minutes. What is the average speed of the car?

1. 30 km/hr
2. 48 km/hr
3. 50 km/hr
4. 54 km/hr

**Options :**

86435199327. 1

86435199328. 2

86435199329. 3

86435199330. 4

**Question Number : 16 Question Id : 86435128720 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

$8.2 \times 7.5 \times 9.3 = \underline{\hspace{2cm}}$

1. 175.95
2. 375.95
3. 571.95
4. 751.95

**Options :**

86435199331. 1
86435199332. 2
86435199333. 3
86435199334. 4

**Question Number : 17 Question Id : 86435128721 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A horse is taken out every morning by the owner whose home faces East. They walk 200 m West, then 500 m in the South direction. Which direction should they take to reach home?

1. South-East
2. South-West
3. North-East
4. North-West

**Options :**

86435199335. 1
86435199336. 2
86435199337. 3
86435199338. 4

**Question Number : 18 Question Id : 86435128722 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Where are the headquarters of International Union for Conservation of Nature and Natural Resources (IUCN) located?

1. New York
2. Sydney
3. Switzerland
4. Singapore

**Options :**

86435199339. 1

86435199340. 2

86435199341. 3

86435199342. 4

**Question Number : 19 Question Id : 86435128723 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Dinesh is taller than Chinku and Elina. Akash is not as tall as Elina. Chinku is taller than Akash. Dinesh is not as tall as Bikash. Who among them is next to the tallest one?

1. Bikash
2. Chinku
3. Akash
4. Dinesh

**Options :**

86435199343. 1

86435199344. 2

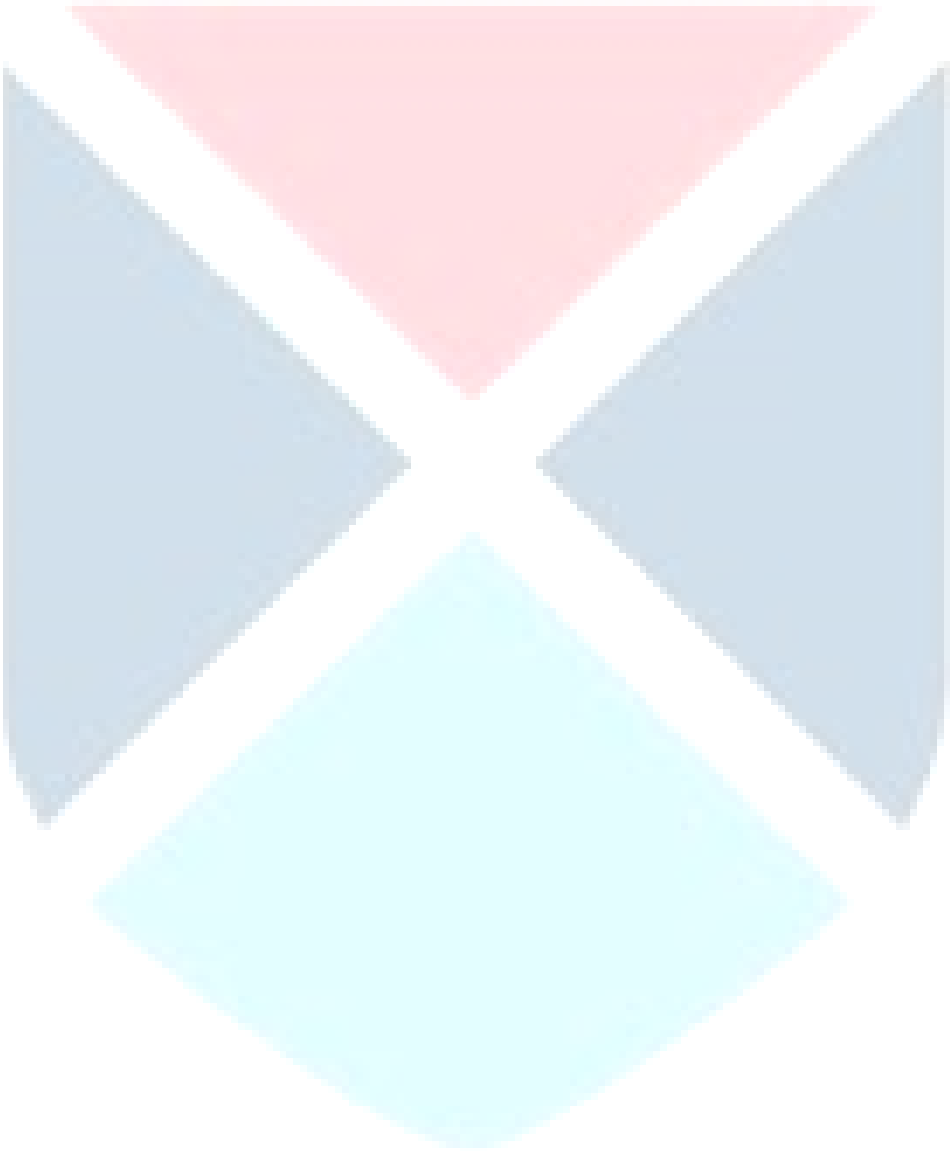
86435199345. 3

86435199346. 4

**Question Number : 20 Question Id : 86435128724 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**



Pox 186 is a

1. glacier
2. star
3. galaxy
4. satellite

**Options :**

86435199347. 1

86435199348. 2

86435199349. 3

86435199350. 4

**Question Number : 21 Question Id : 86435128725 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

HRMN 99, recently figured in the news, is related to

1. fruit
2. animal
3. virus
4. disease

**Options :**

86435199351. 1

86435199352. 2

86435199353. 3

86435199354. 4

**Question Number : 22 Question Id : 86435128726 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The most important text of vedic mathematics is

1. *Sulva Sutras*
2. *Atharvaveda*
3. *Satapatha Brahmana*
4. *Chandogya Upanishad*

**Options :**

86435199355. 1  
86435199356. 2  
86435199357. 3  
86435199358. 4

**Question Number : 23 Question Id : 86435128727 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The words *Satyameva Jayate* in the State Emblem of India are taken from

1. *Samaveda*
2. *Rigveda*
3. *Ramayana*
4. *Upanishads*

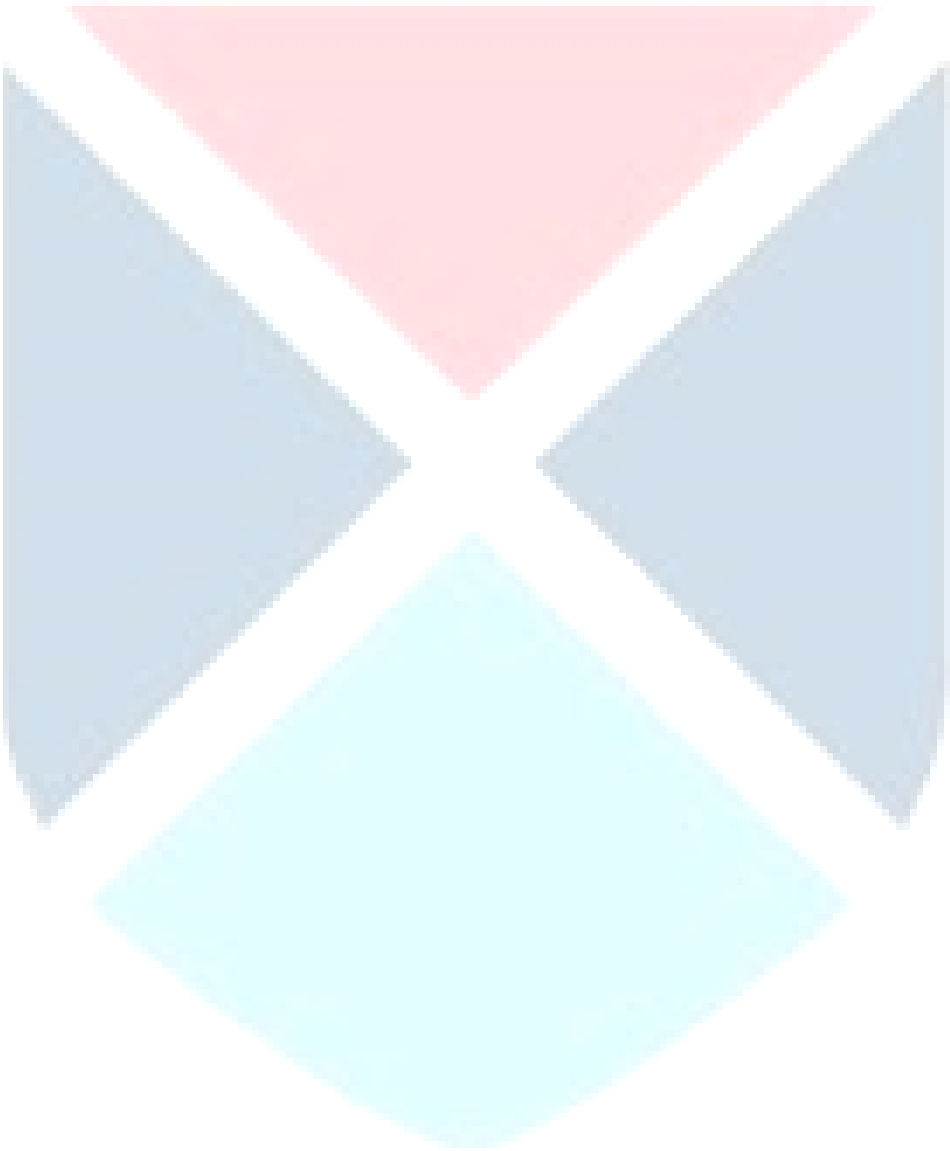
**Options :**

86435199359. 1  
86435199360. 2  
86435199361. 3  
86435199362. 4

**Question Number : 24 Question Id : 86435128728 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Who was the leader of the Bardoli Satyagraha?

1. Rajendra Prasad
2. Vallabhbhai Patel
3. Mahatma Gandhi
4. Jivatram Bhagwandas Kripalani

**Options :**

86435199363. 1  
86435199364. 2  
86435199365. 3  
86435199366. 4

**Question Number : 25 Question Id : 86435128729 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

PMJDY Scheme stands for

1. Pradhan Mitra Jeevan Dhan Yojana
2. Pradhan Mantri Jan Dhan Yojana
3. Pradhan Mitra Jan Dhan Yojana
4. Pradhan Mantri Jeevan Dhan Yojana

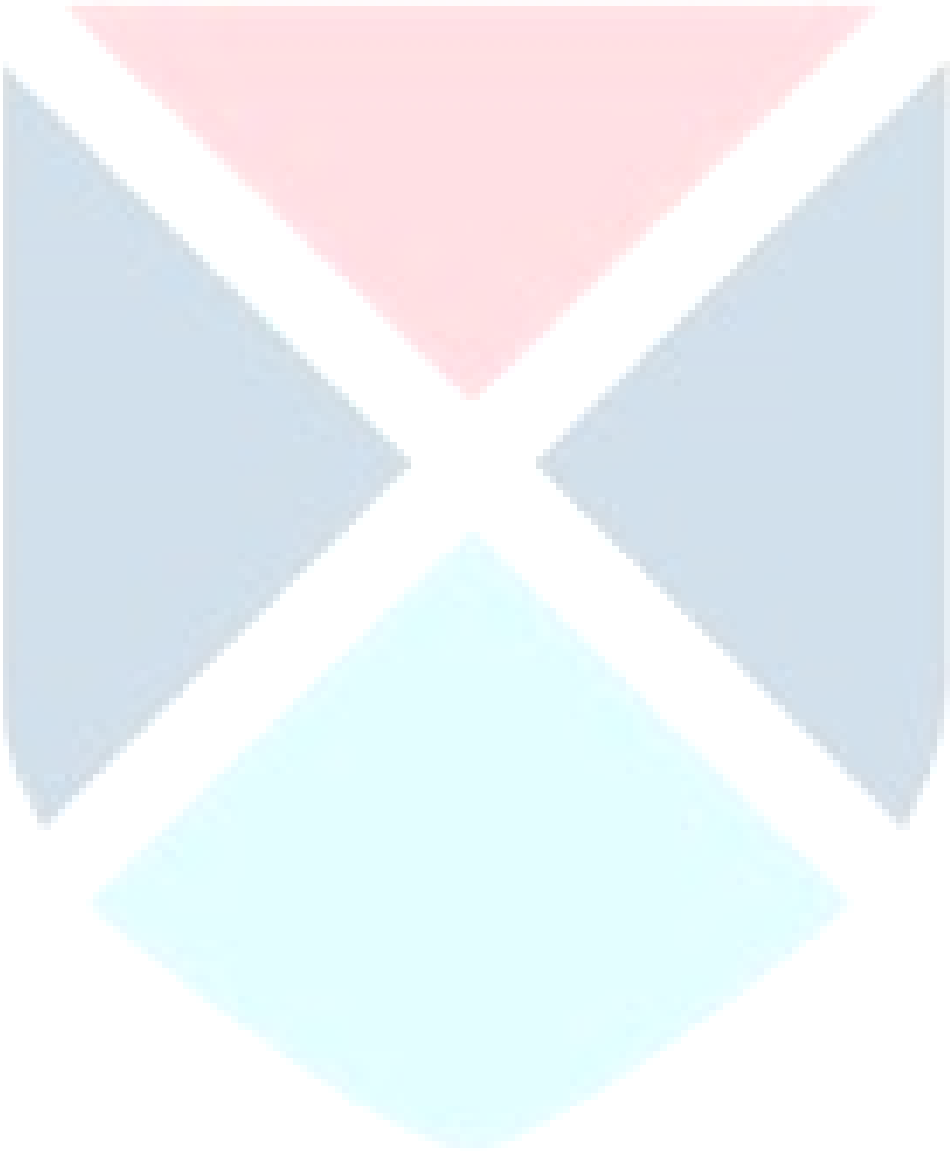
**Options :**

86435199367. 1  
86435199368. 2  
86435199369. 3  
86435199370. 4

## Part B Physics

**Section Id :**

8643511203



<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	25
<b>Number of Questions to be attempted :</b>	25
<b>Section Marks :</b>	100
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	8643511436
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 26 Question Id : 86435128730 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

While measuring the length of the rod by vernier callipers, the reading on the main scale is 6.4 cm and the eight divisions on vernier is in line with marking on the main scale division. If the least count of callipers is 0.01 and zero error – 0.04 cm, the length of the rod is

1. 6.52 cm
2. 6.48 cm
3. 6.44 cm
4. 6.4 cm

**Options :**

86435199371. 1

86435199372. 2

86435199373. 3

86435199374. 4

**Question Number : 27 Question Id : 86435128731 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Pressure  $P$  varies as  $P = \frac{\alpha}{\beta} \exp\left(-\frac{\alpha x}{k_B T}\right)$ , where  $x$  denotes the distance,  $k_B$  is the Boltzmann's constant,  $T$  is the absolute temperature and  $\alpha$  and  $\beta$  are constant. The dimension of  $\beta$  is

1.  $[MLT^{-2}]$
2.  $[ML^{-1}T^{-2}]$
3.  $[M^0L^2T^0]$
4.  $[M^0L^0T^0]$

**Options :**

86435199375. 1  
86435199376. 2  
86435199377. 3  
86435199378. 4

**Question Number : 28 Question Id : 86435128732 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If two resistors of resistances  $R_1 = (4 \pm 0.5) \Omega$  and  $R_2 = (16 \pm 0.5) \Omega$  are connected in series. The equivalent resistance with the limits of percentage error is

1.  $(20 \pm 1\%) \Omega$
2.  $(20 \pm 5\%) \Omega$
3.  $(20 \pm 0.25\%) \Omega$
4.  $(20 \pm 0.5\%) \Omega$

**Options :**

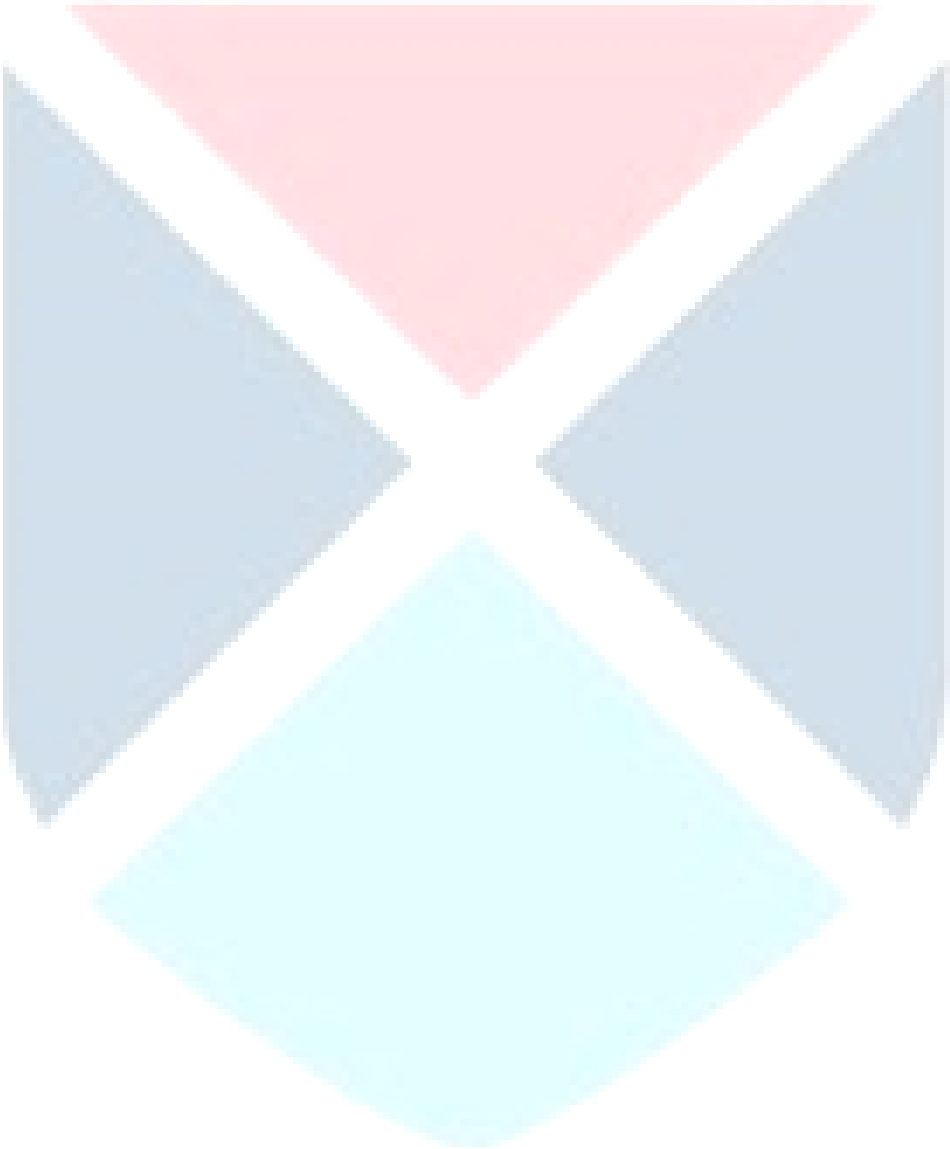
86435199379. 1  
86435199380. 2  
86435199381. 3  
86435199382. 4

**Question Number : 29 Question Id : 86435128733 Question Type : MCQ Option Shuffling : No**

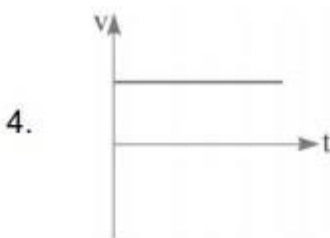
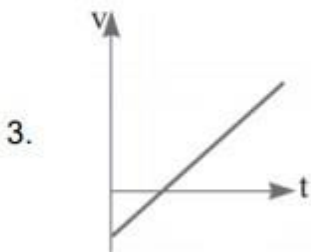
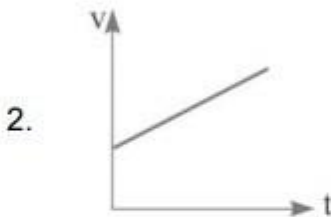
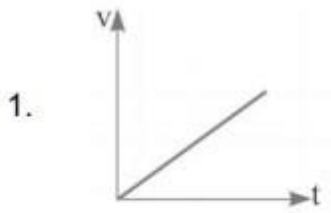
**Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**



The position-time relation of a particle moving along the  $x$ -axis is given by  $x = a - bt + ct^2$  where  $a$ ,  $b$  and  $c$  are positive numbers. The velocity-time graph of the particle is



**Options :**

86435199383. 1

86435199384. 2

86435199385. 3

86435199386. 4

**Question Number : 30 Question Id : 86435128734 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A police van moving on a highway with a speed of 30 km/h fires a bullet at a thief's car speeding away in the same direction with a speed of 192 km/h. If the muzzle speed of the bullet is 150 m/s, with what speed does the bullet hit the thief's car?

1. 475/3 m/s
2. 160/3 m/s
3. 150 m/s
4. 105 m/s

**Options :**

86435199387. 1  
86435199388. 2  
86435199389. 3  
86435199390. 4

**Question Number : 31 Question Id : 86435128735 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A constant retarding force of 50 N is applied to a body of mass 20 kg moving initially with a speed of  $15 \text{ m s}^{-1}$ . How long does the body take to stop?

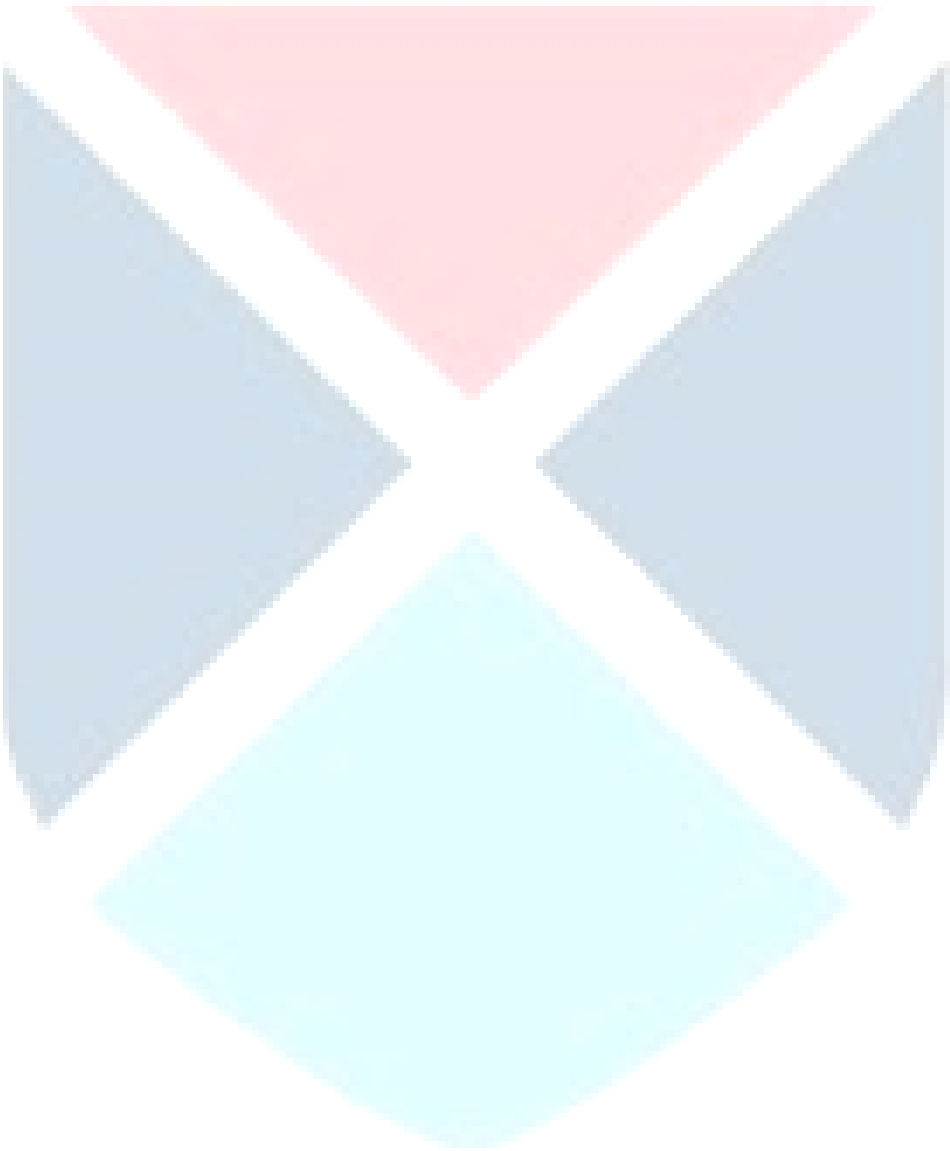
1. 6 s
2. 2.5 s
3. 15 s
4. 50 s

**Options :**

86435199391. 1  
86435199392. 2  
86435199393. 3  
86435199394. 4

**Question Number : 32 Question Id : 86435128736 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**

An aircraft executes a horizontal loop of radius 1.00 km with a steady speed of 900 km/h. Its centripetal acceleration is

1.  $0.4 \text{ m/s}^2$
2.  $250 \text{ m/s}^2$
3.  $62.5 \text{ m/s}^2$
4.  $6.38 \text{ m/s}^2$

**Options :**

86435199395. 1  
86435199396. 2  
86435199397. 3  
86435199398. 4

**Question Number : 33 Question Id : 86435128737 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The velocity of a body of mass 2 kg as a function of time  $t$  is given by  $v(t) = 2t\hat{i} + t^2\hat{j}$ . The force acting on it, at time  $t = 2$  s is given by

1.  $(4\hat{i} + 4\hat{j}) \text{ N}$
2.  $(2\hat{i} + 2\hat{j}) \text{ N}$
3.  $(4\hat{i} + 2\hat{j}) \text{ N}$
4.  $(4\hat{i} + 8\hat{j}) \text{ N}$

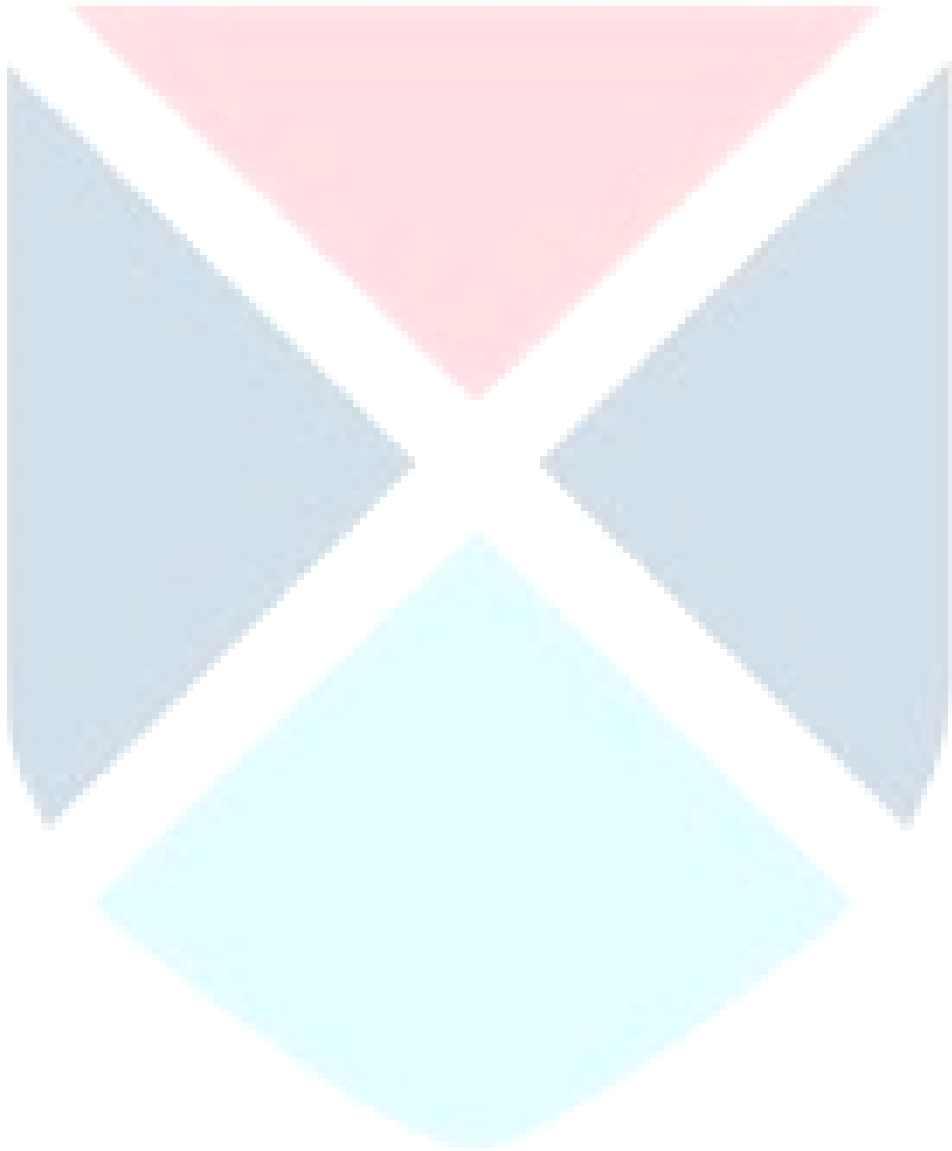
**Options :**

86435199399. 1  
86435199400. 2  
86435199401. 3  
86435199402. 4

**Question Number : 34 Question Id : 86435128738 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



A particle of mass  $m$  is moving in a circular path of constant radius  $r$  such that, its centripetal acceleration  $a_c$  is varying with time  $t$  as  $a_c = k^2 r t^2$ , where  $k$  is a constant. The power delivered to the particle by the forces acting on it is

1.  $mk^2rt^2$
2.  $mk^2r^2t$
3.  $mkrt$
4.  $mkr^2t^2$

**Options :**

86435199403. 1

86435199404. 2

86435199405. 3

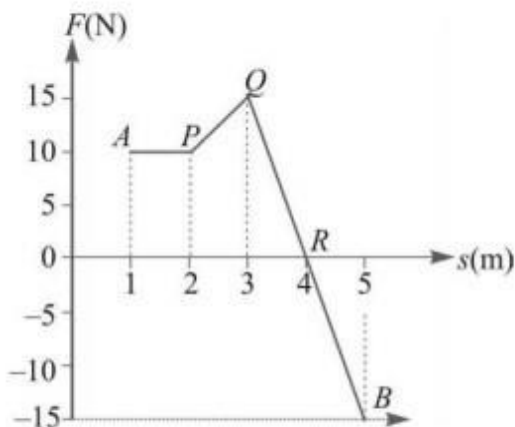
86435199406. 4

**Question Number : 35 Question Id : 86435128739 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A body moves from point A to B under the action of a force, varying in magnitude as shown in the figure. Force is expressed in newton and displacement in meter. What is the total work done?

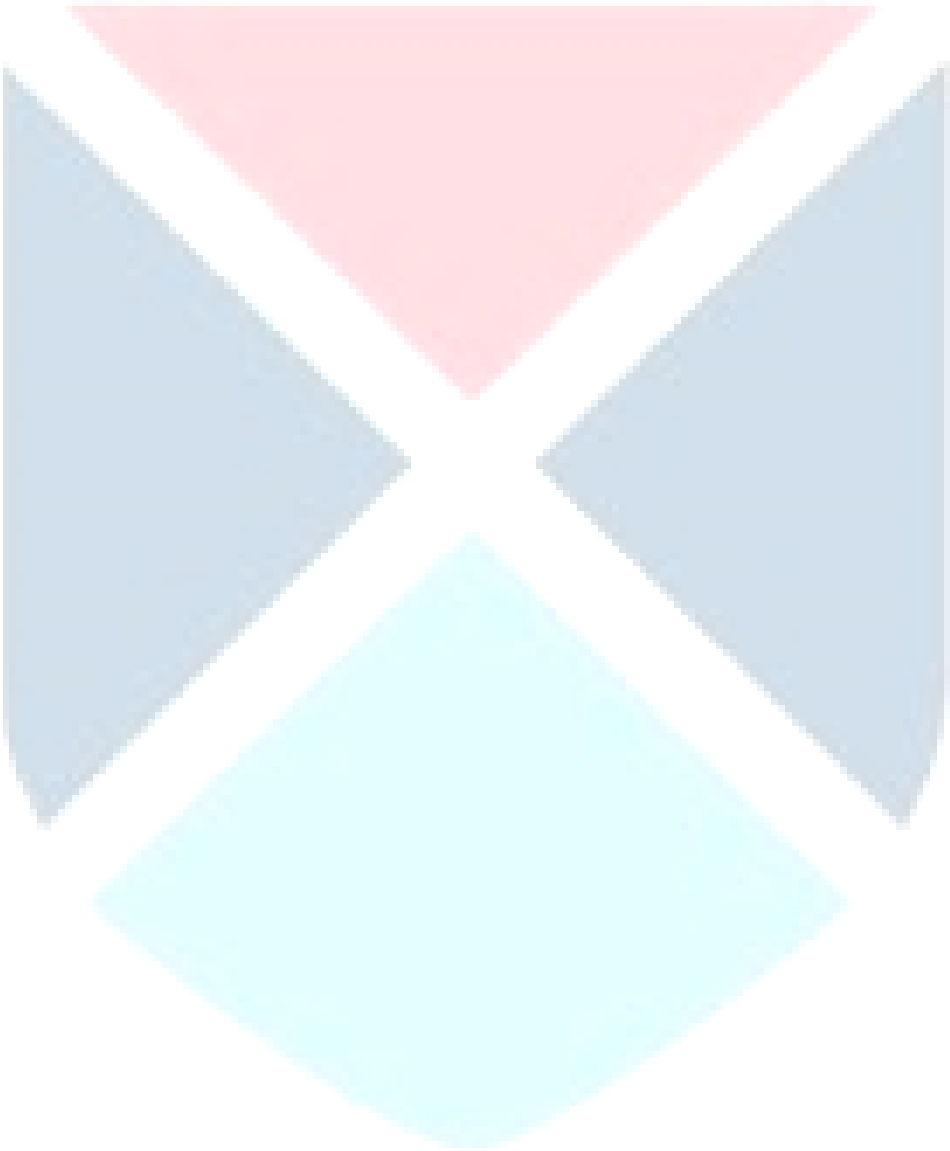


1. 37.5 J
2. 100 J
3. 12.5 J
4. 22.5 J

**Options :**

86435199407. 1

86435199408. 2





86435199409. 3

86435199410. 4

**Question Number : 36 Question Id : 86435128740 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A family uses 8 kW of power. Direct solar energy is incident on the horizontal surface at an average rate of 200 W per square meter. If 20% of this energy can be converted to useful electrical energy, how large an area is needed to supply 8 kW?

1. 200 m<sup>2</sup>
2. 40 m<sup>2</sup>
3. 5 m<sup>2</sup>
4. 800 m<sup>2</sup>

**Options :**

86435199411. 1

86435199412. 2

86435199413. 3

86435199414. 4

**Question Number : 37 Question Id : 86435128741 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A bomb explodes in air when it has a horizontal speed of  $v$ . It breaks into two identical pieces of equal mass. If one goes vertically up at a speed of  $4v$ , the velocity of other immediately after the explosion is

1.  $-4v\hat{j}$
2.  $-v\hat{i}$
3.  $2v\hat{i} - 4v\hat{j}$
4.  $2v\hat{i} + 4v\hat{j}$

**Options :**

86435199415. 1



86435199417. 3

86435199418. 4

**Question Number : 38 Question Id : 86435128742 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Assuming the earth to be a sphere of a uniform mass density, how much would a body weigh half way down to the center of earth if it weighed 250 N on the surface?

1. 375 N
2. 125 N
3. 500 N
4. 72.5 N

**Options :**

86435199419. 1

86435199420. 2

86435199421. 3

86435199422. 4

**Question Number : 39 Question Id : 86435128743 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

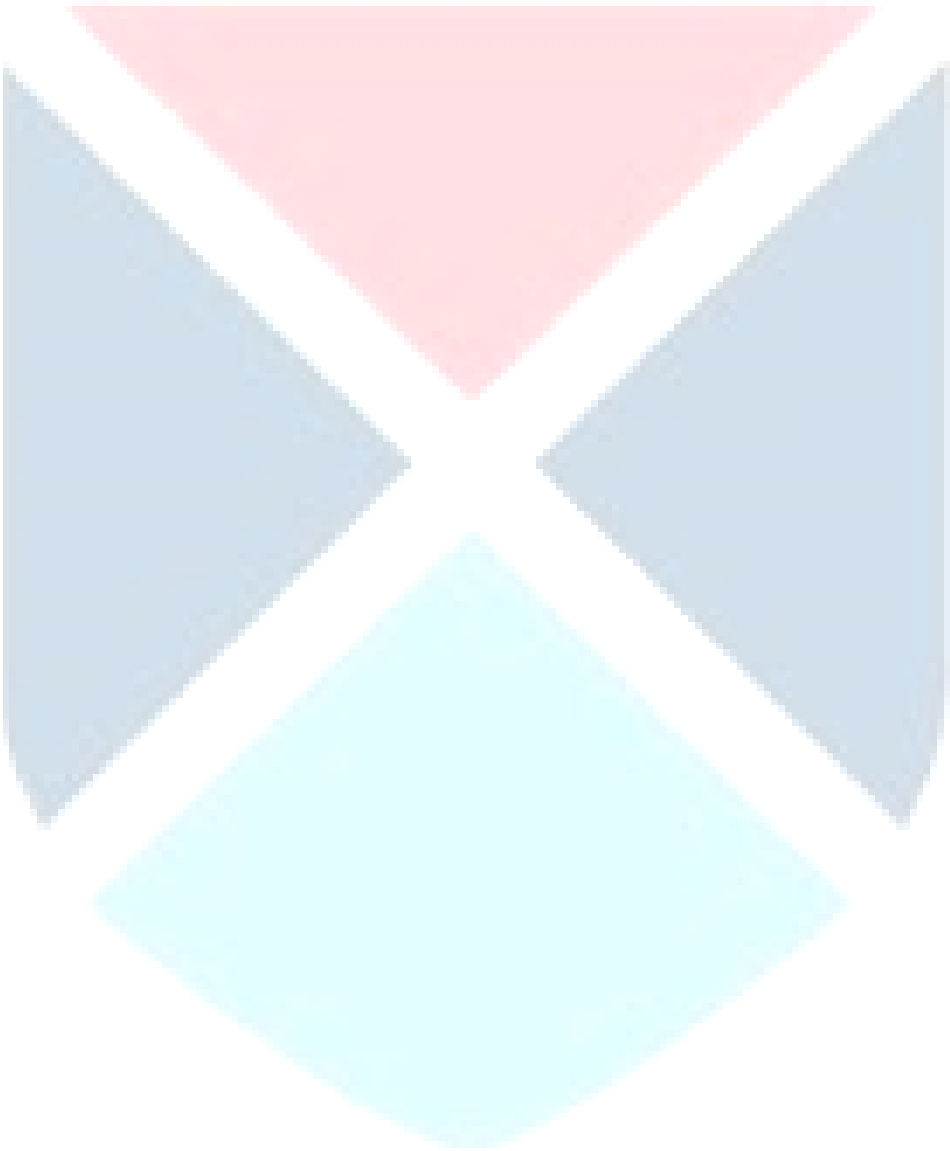
**Correct Marks : 4 Wrong Marks : 1**

A 40 kg boy whose legs are  $4 \text{ cm}^2$  in area and 50 cm long falls through a height of 2 m without breaking his leg bones. If the bones can withstand a stress of  $0.9 \times 10^8 \text{ N/m}^2$ . The Young's modulus for the material of the bone is

1.  $0.9 \times 10^8 \text{ N/m}^2$
2.  $5 \times 10^8 \text{ N/m}^2$
3.  $2.05 \times 10^9 \text{ N/m}^2$
4.  $2.05 \times 10^8 \text{ N/m}^2$

**Options :**

86435199423. 1



86435199425. 3

86435199426. 4

**Question Number : 40 Question Id : 86435128744 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The length of a metal wire is  $l_1$  when the tension is  $T_1$  and  $l_2$  when the tension is  $T_2$ . The unstretched length of the wire is

1.  $\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$

2.  $\frac{T_2 l_1 + T_1 l_2}{T_2 - T_1}$

3.  $\frac{T_2 l_1 - T_1 l_2}{T_2 + T_1}$

4.  $\frac{T_2 l_1 + T_1 l_2}{T_2 + T_1}$

**Options :**

86435199427. 1

86435199428. 2

86435199429. 3

86435199430. 4

**Question Number : 41 Question Id : 86435128745 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Two cylinders  $A$  and  $B$  of the same material have same length, their radii being in the ratio  $1 : 2$  respectively. The two are joined end to end as shown in the figure. One end of cylinder  $A$  is rigidly clamped while free end of cylinder  $B$  is twisted through an angle  $\theta$ . The angle of twist of cylinder  $A$  is



1.  $\frac{17}{16}\theta$
2.  $16\theta$
3.  $17\theta$
4.  $\frac{16}{17}\theta$

**Options :**

86435199431. 1

86435199432. 2

86435199433. 3

86435199434. 4

**Question Number : 42 Question Id : 86435128746 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

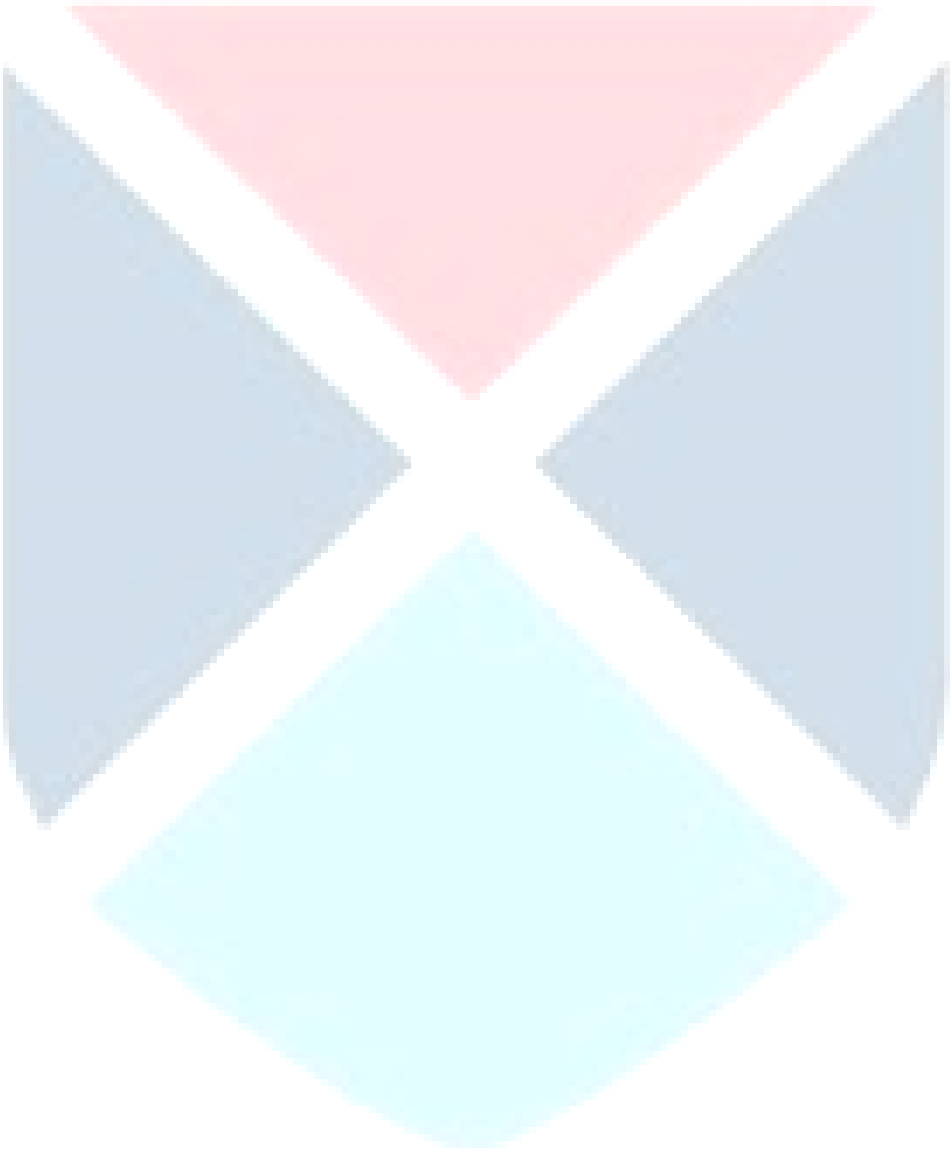
Soapy water drips from a capillary. When the drop breaks away, the diameter of its neck is  $D$ . The mass of the drop is  $m$ . The surface tension of soapy water is

1.  $\frac{mgD}{\pi}$
2.  $\frac{mg}{\pi D}$
3.  $\frac{mg}{D}$
4.  $\frac{m}{\pi gD}$

**Options :**

86435199435. 1

86435199436. 2



86435199437. 3

86435199438. 4

**Question Number : 43 Question Id : 86435128747 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If the total energy of a particle executing SHM is  $E$ , then the potential energy  $V$  and the kinetic energy  $K$  of the particle in terms of  $E$  when its displacement is half of its amplitude will be

1.  $V = E/4$  and  $K = 3E/4$
2.  $V = 3E/4$  and  $K = E/4$
3.  $V = 3E/4$  and  $K = 3E/4$
4.  $V = E/4$  and  $K = E/4$

**Options :**

86435199439. 1

86435199440. 2

86435199441. 3

86435199442. 4

**Question Number : 44 Question Id : 86435128748 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

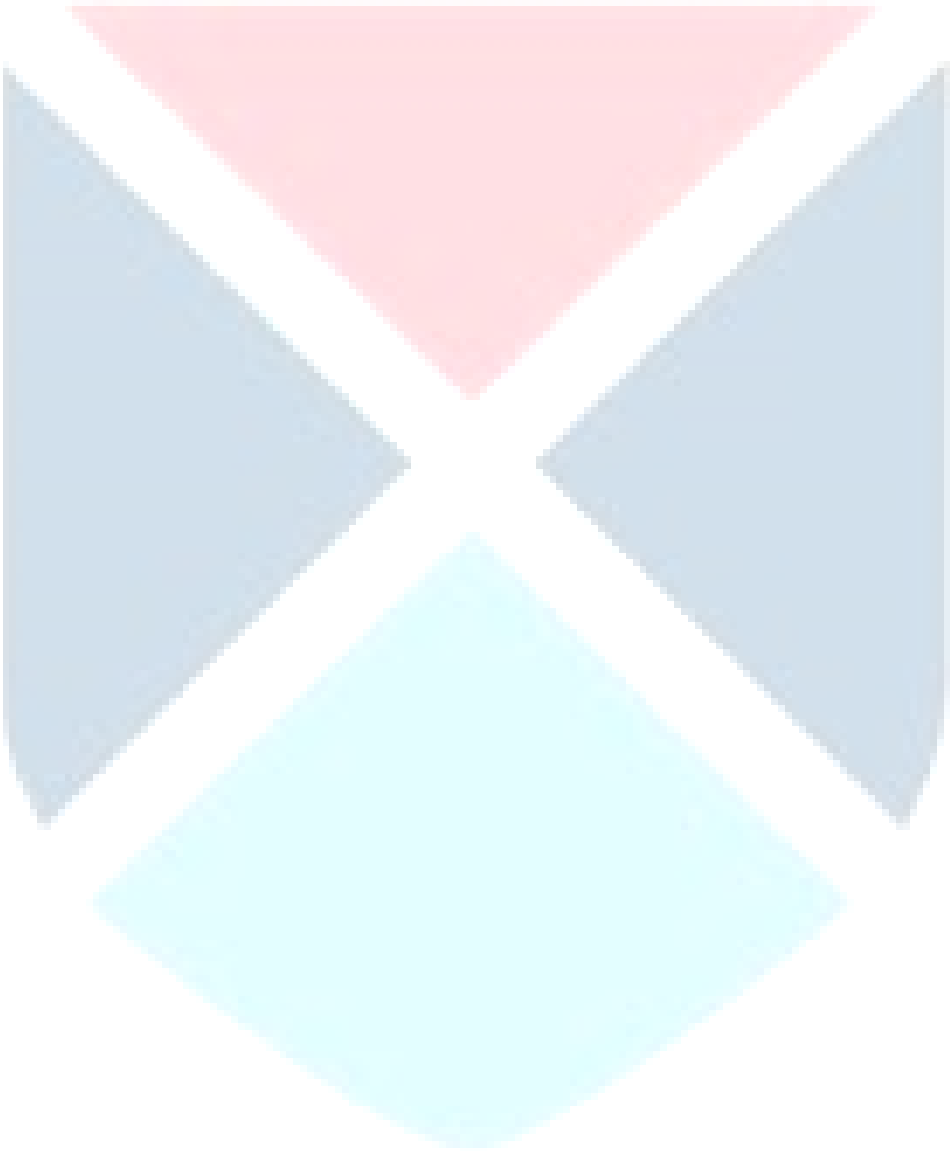
A spring balance has a scale that reads 0 to 50 kg. The length of the scale is 20 cm. A body suspended from this spring, when displaced and released, oscillates with a period of 0.60 s. What is the weight of the body?

1. 22.36 N
2. 45 N
3. 219.13 N
4. 223.6 N

**Options :**

86435199443. 1





86435199445. 3

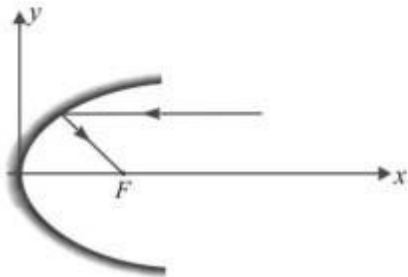
86435199446. 4

**Question Number : 45 Question Id : 86435128749 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A parallel beam of light ray parallel to the  $x$ -axis is incident on a parabolic reflecting surface  $x = 2by^2$  as shown in the figure. After reflecting it passes through focal point  $F$ . What is the focal length of the reflecting surface?



1.  $\frac{1}{2b}$
2.  $\frac{1}{8b}$
3.  $\frac{1}{4b}$
4.  $\frac{1}{b}$

**Options :**

86435199447. 1

86435199448. 2

86435199449. 3

86435199450. 4

**Question Number : 46 Question Id : 86435128750 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Two slits in Young's interference experiment have width in the ratio 1 : 4. The ratio of intensity at the maxima and minima in their interference is

1.  $\frac{1}{9}$
2.  $\frac{1}{4}$
3.  $\frac{9}{1}$
4.  $\frac{9}{4}$

**Options :**

86435199451. 1

86435199452. 2

86435199453. 3

86435199454. 4

**Question Number : 47 Question Id : 86435128751 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A positive charge  $q$  is distributed over a circular ring of radius  $a$ . It is placed in a horizontal plane and is rotated about its axis at a uniform angular speed  $\omega$ . A horizontal magnetic field  $B$  exists in the space. The torque acting on the ring due to the magnetic force is

1.  $\frac{1}{2}q\omega a^2 B$
2.  $\frac{1}{2}q\omega a B$
3.  $\frac{1}{2}q\omega^2 a B$
4.  $q\omega a^2 B$

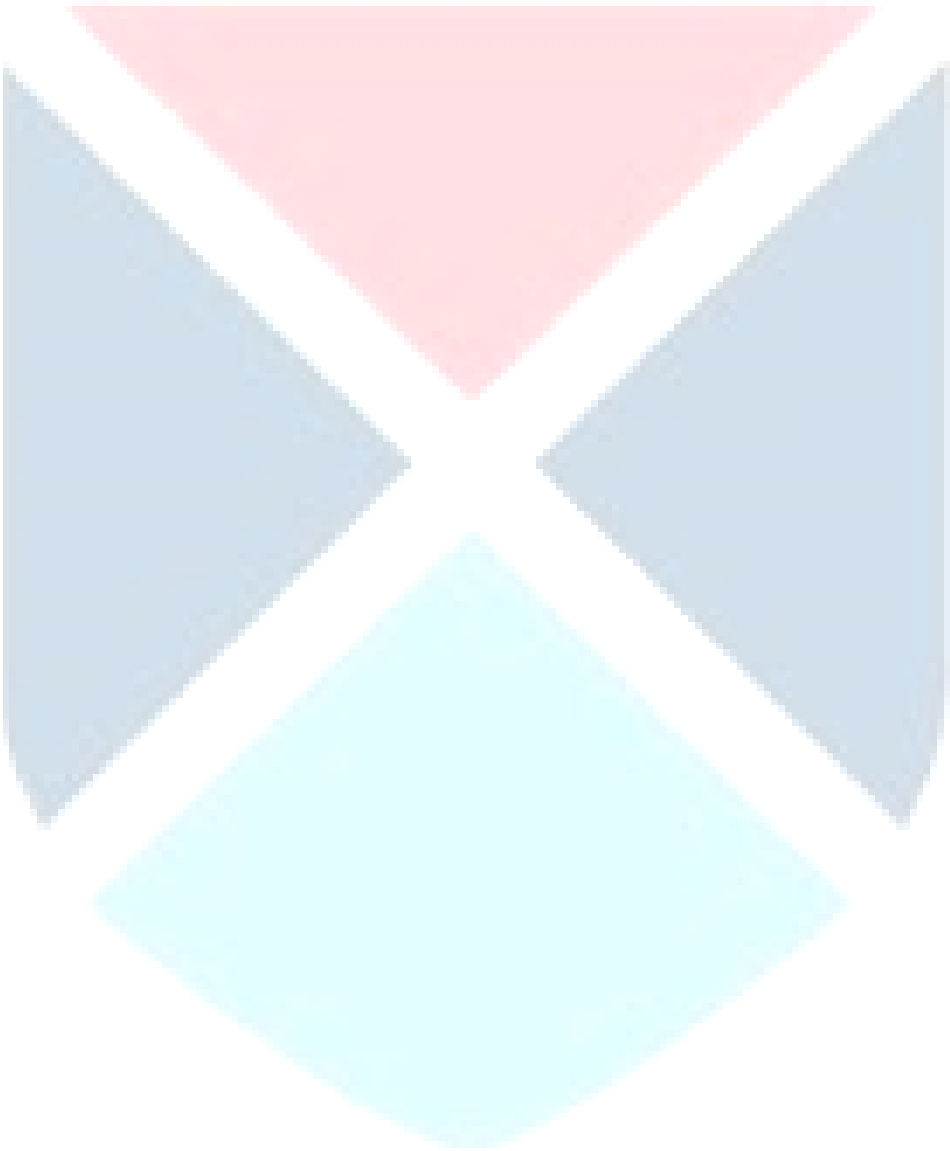
**Options :**

86435199455. 1

86435199456. 2

86435199457. 3

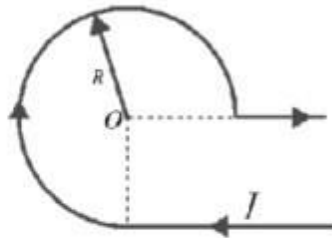
86435199458. 4



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

What is the magnetic induction of the field at the point  $O$  in a current  $I$  carrying wire that has the shape as shown in the figure? The radius of the curved part of the wire is  $R$ , the linear parts are assumed to be very long.



1.  $\frac{\mu_0 I}{4\pi R} [2 + \pi]$
2.  $\frac{\mu_0 I}{4\pi R} [2 + \frac{3\pi}{2}]$
3.  $\frac{\mu_0 I}{4\pi R} [1 + \frac{\pi}{2}]$
4.  $\frac{\mu_0 I}{4\pi R} [1 + \frac{3\pi}{2}]$

**Options :**

86435199459. 1

86435199460. 2

86435199461. 3

86435199462. 4

**Question Number : 49 Question Id : 86435128753 Question Type : MCQ Option Shuffling : No**

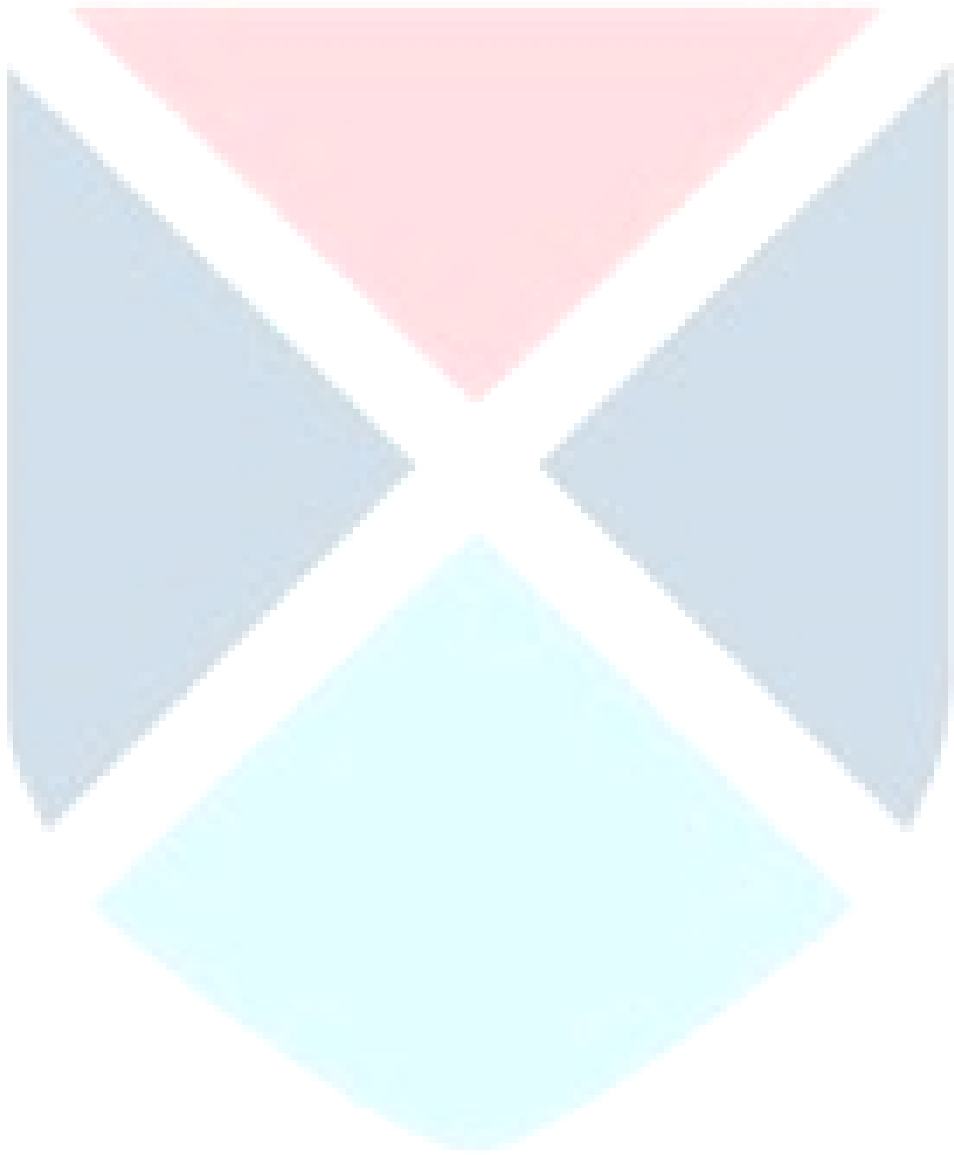
**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

When a beam of 10.6 eV photons of intensity  $2.0 \text{ W/m}^2$  falls on a platinum surface of area  $1.0 \times 10^{-4} \text{ m}^2$ , only 53% of the incident photons eject photoelectrons. The number of photoelectrons emitted per second is

1.  $6.25 \times 10^{13}$
2.  $11.79 \times 10^{13}$
3.  $62.5 \times 10^{11}$
4.  $11.79 \times 10^{11}$

**Options :**



86435199464. 2

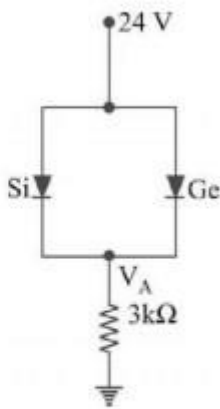
86435199465. 3

86435199466. 4

**Question Number : 50 Question Id : 86435128754 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

In the circuit shown in figure, the potential barrier for Ge diode is 0.3 V and for Si diode it is 0.7 V. What is the voltage  $V_A$ ?



1. 23.7 V
2. 23 V
3. 24.3 V
4. 24.7 V

**Options :**

86435199467. 1

86435199468. 2

86435199469. 3

86435199470. 4

## Part C Chemistry

**Section Id :**

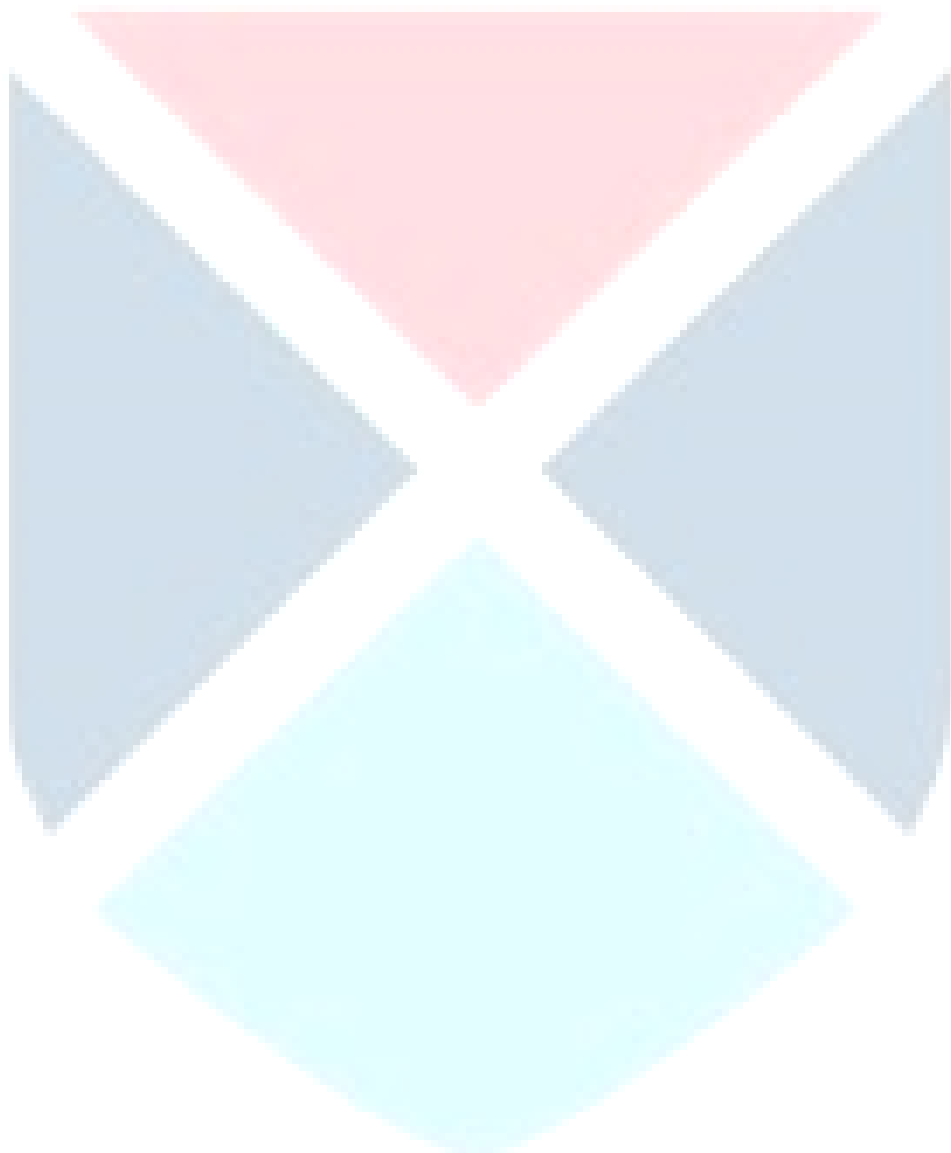
8643511204

**Section Number :**

3

**Section type :**

Online





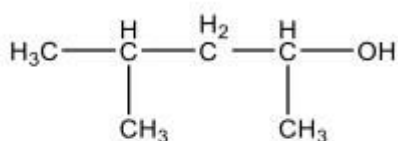
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	25
<b>Number of Questions to be attempted :</b>	25
<b>Section Marks :</b>	100
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	8643511437
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 51 Question Id : 86435128755 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The correct IUPAC name for the given molecule should be



1. 4,4-dimethylbutan-2-ol
2. 4-methylpentan-2-ol
3. 2-methylpentan-4-ol
4. 1,1-dimethylbutan-3-ol

**Options :**

86435199471. 1

86435199472. 2

86435199473. 3

86435199474. 4

**Question Number : 52 Question Id : 86435128756 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A compound with the molecular formula  $C_5H_5N$  and having 3 double bonds will be

1. heterocyclic and aromatic
2. homocyclic and aromatic
3. heterocyclic and non-aromatic
4. homocyclic and non-aromatic

**Options :**

86435199475. 1

86435199476. 2

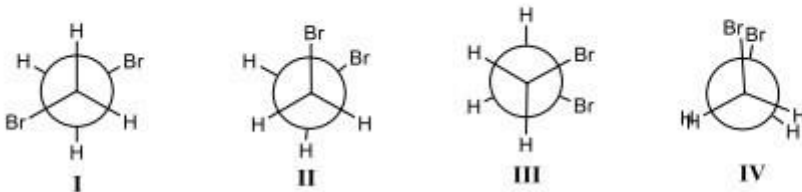
86435199477. 3

86435199478. 4

**Question Number : 53 Question Id : 86435128757 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The most stable conformation of 1,2-dibromomethane among the following is



1. I
2. II
3. III
4. IV

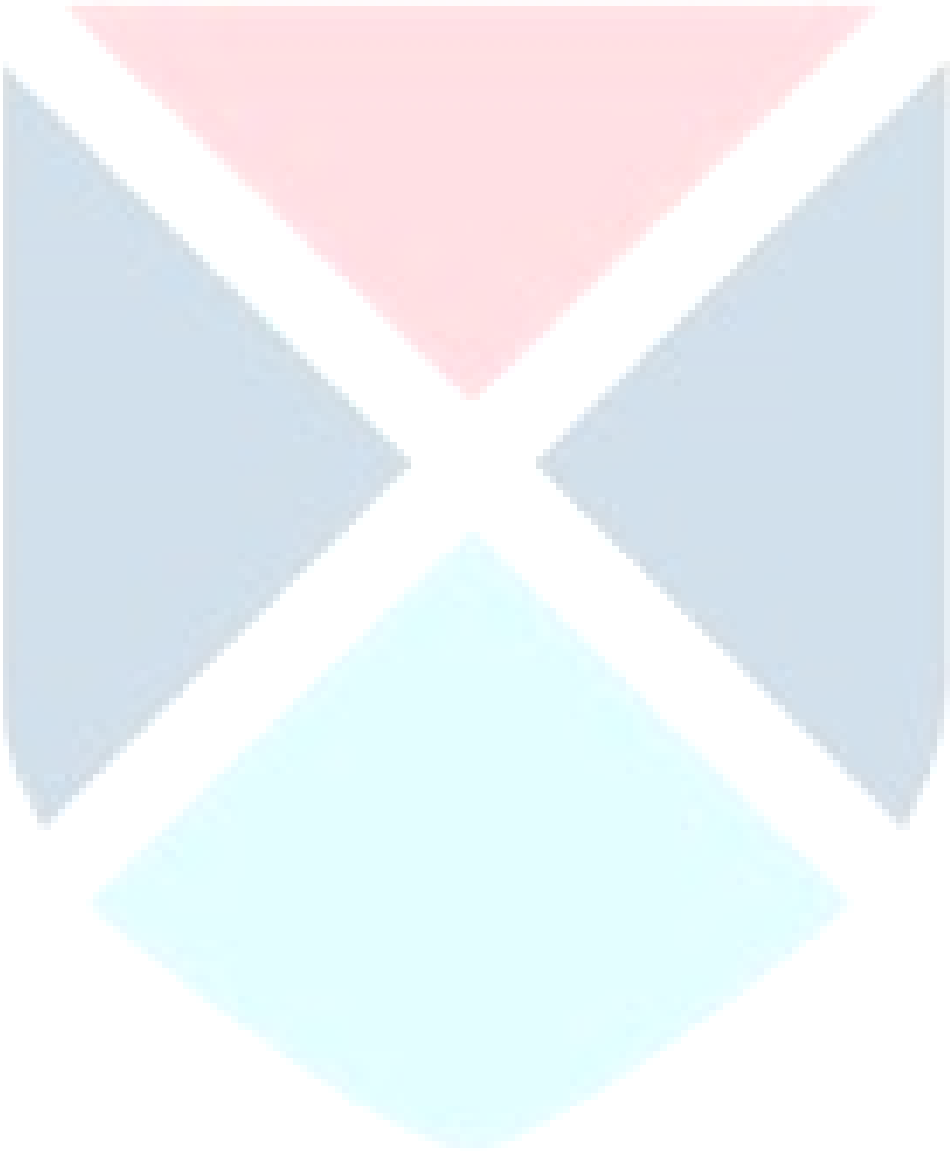
**Options :**

86435199479. 1

86435199480. 2

86435199481. 3

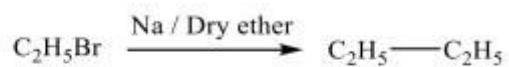
86435199482. 4



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Identify the following named reaction :



1. Wurtz reaction
2. Sandmeyer's reaction
3. Williamson's synthesis
4. Ullmann reaction

**Options :**

- 86435199483. 1
- 86435199484. 2
- 86435199485. 3
- 86435199486. 4

**Question Number : 55 Question Id : 86435128759 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

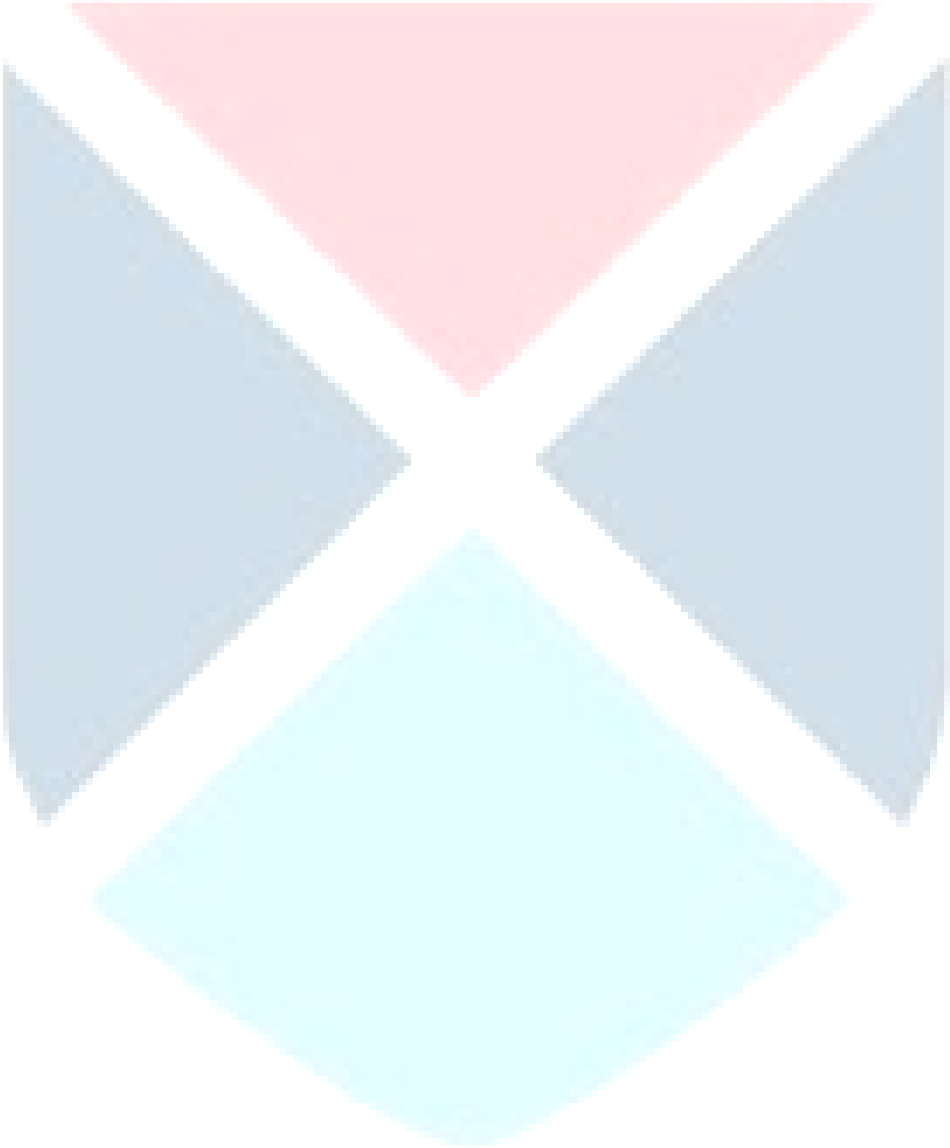
Which of the following pairs can be distinguished by Lucas test?

1. Ethanol and ethylene glycol
2. *o*- and *p*-cresol
3. propan-1-ol and ethanol
4. Butan-1-ol and 2-methylpropan-2-ol

**Options :**

- 86435199487. 1
- 86435199488. 2
- 86435199489. 3
- 86435199490. 4

**Question Number : 56 Question Id : 86435128760 Question Type : MCQ Option Shuffling : No**



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following does not give iodoform test?

1. Ethanol
2. Ethanal
3. Propan-2-ol
4. Butan-1-ol

**Options :**

86435199491. 1  
86435199492. 2  
86435199493. 3  
86435199494. 4

**Question Number : 57 Question Id : 86435128761 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The product formed upon heating methyl bromide with potassium tert-butoxide is

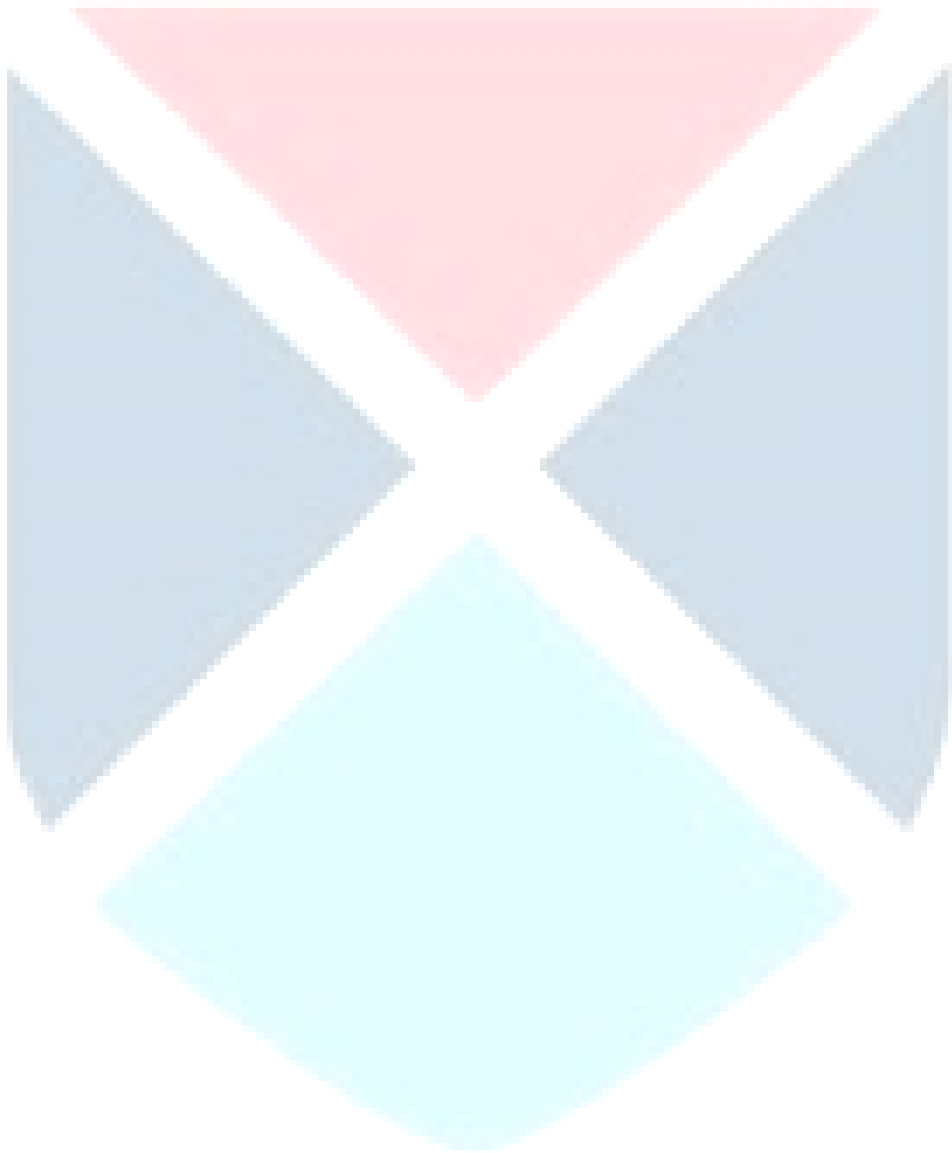
1. Di-tert-butyl ether
2. Dimethyl ether
3. Isobutylene
4. tert-butyl methyl ether

**Options :**

86435199495. 1  
86435199496. 2  
86435199497. 3  
86435199498. 4

**Question Number : 58 Question Id : 86435128762 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**

Which of the following compounds gives a positive Tollen's test but negative Fehling's test?

1. Acetaldehyde
2. Benzaldehyde
3. Acetophenone
4. Acetone

**Options :**

86435199499. 1  
86435199500. 2  
86435199501. 3  
86435199502. 4

**Question Number : 59 Question Id : 86435128763 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following is the strongest acid?

1. Fluoroacetic acid
2. Trifluoroacetic acid
3. Chloroacetic acid
4. Difluoroacetic acid

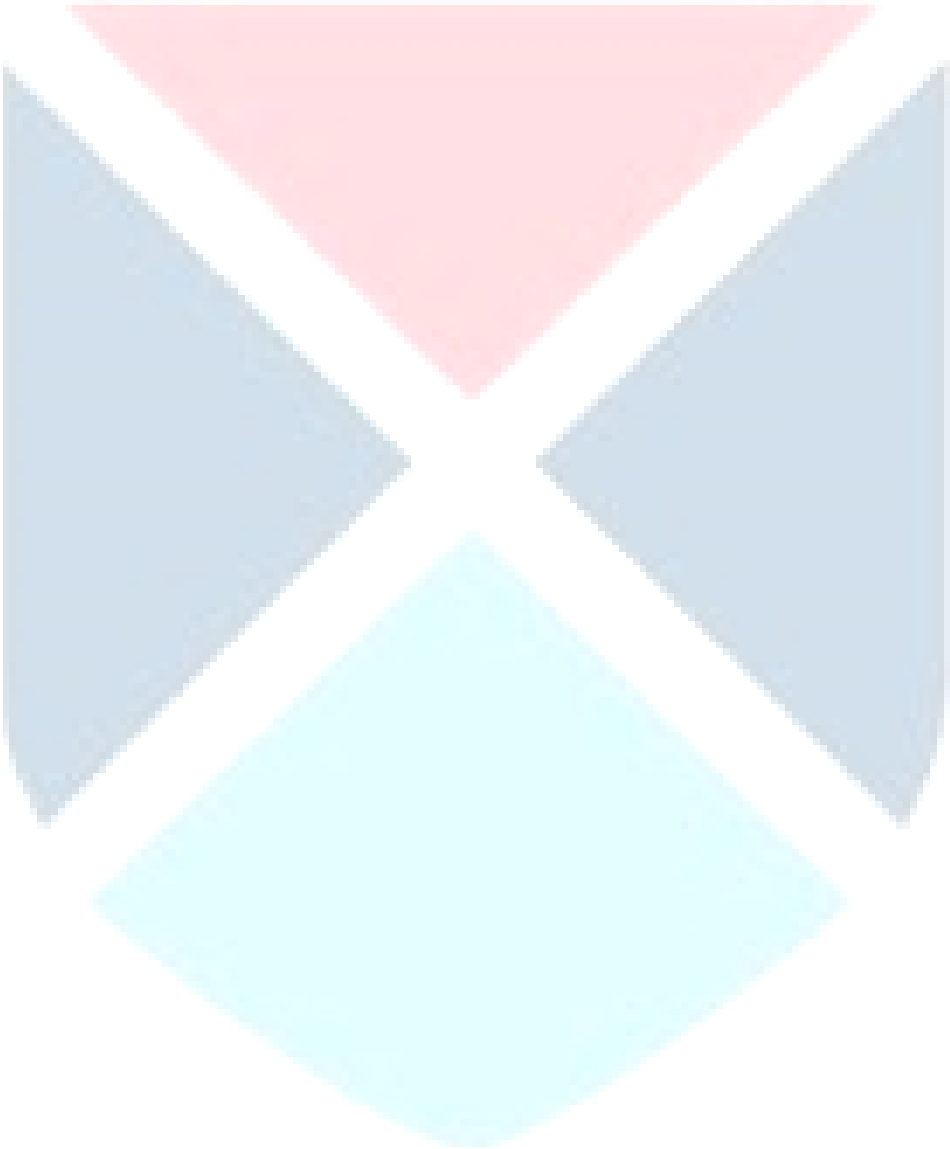
**Options :**

86435199503. 1  
86435199504. 2  
86435199505. 3  
86435199506. 4

**Question Number : 60 Question Id : 86435128764 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**



In order to distinguish between  $C_2H_5NH_2$  and  $C_6H_5NH_2$ , which of the following reagents is useful?

1. Hinsberg test
2.  $\beta$ -Naphthol
3.  $CHCl_3/KOH$
4. NaOH

**Options :**

86435199507. 1  
86435199508. 2  
86435199509. 3  
86435199510. 4

**Question Number : 61 Question Id : 86435128765 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

In which of the following compounds, metal is in lowest oxidation state?

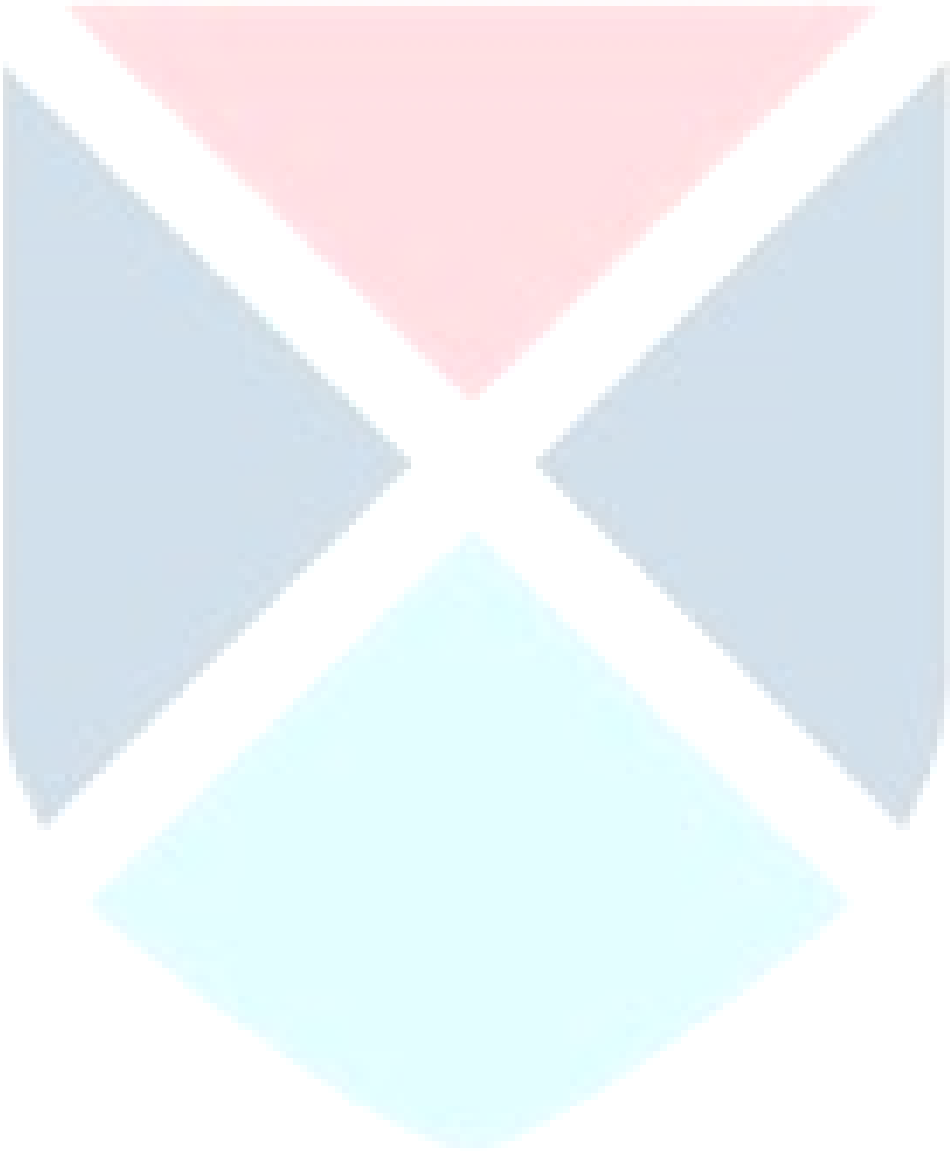
1.  $Fe_3[Fe(CN)_6]_2$
2.  $Mn_2(CO)_{10}$
3.  $K[PtCl_3(C_2H_4)]$
4.  $[Co(NH_3)_5Br]_2SO_4$

**Options :**

86435199511. 1  
86435199512. 2  
86435199513. 3  
86435199514. 4

**Question Number : 62 Question Id : 86435128766 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



The element with atomic number 53 belongs to

1. halogens
2. *d*-block
3. chalcogens
4. coinage metals

**Options :**

86435199515. 1

86435199516. 2

86435199517. 3

86435199518. 4

**Question Number : 63 Question Id : 86435128767 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The correct set of quantum numbers for *3d* subshell is

1.  $n = 3, l = 2$
2.  $n = 3, l = 1$
3.  $n = 2, l = 3$
4.  $n = 3, l = 3$

**Options :**

86435199519. 1

86435199520. 2

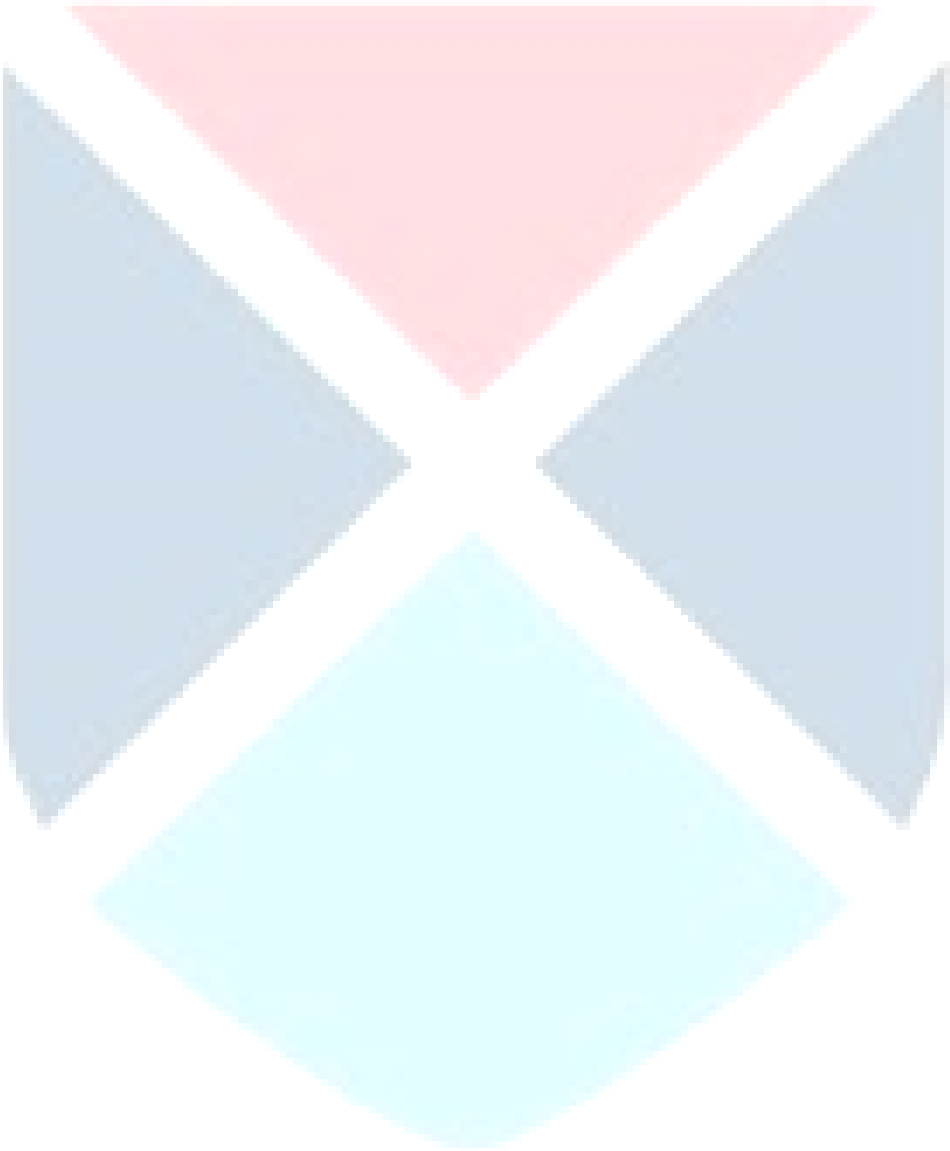
86435199521. 3

86435199522. 4

**Question Number : 64 Question Id : 86435128768 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Correct number of lone pairs in SF<sub>4</sub> and H<sub>2</sub>O molecules, respectively, should be

1. 1 and 2
2. 2 and 1
3. 1 and 1
4. 2 and 2

**Options :**

86435199523. 1

86435199524. 2

86435199525. 3

86435199526. 4

**Question Number : 65 Question Id : 86435128769 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which one of the following pairs has only paramagnetic species?

1. [Cu(NH<sub>3</sub>)<sub>4</sub>]Cl<sub>2</sub> and O<sub>2</sub>
2. [Cu(NH<sub>3</sub>)<sub>4</sub>]Cl<sub>2</sub> and N<sub>2</sub>
3. [Zn(H<sub>2</sub>O)<sub>6</sub>]Cl<sub>2</sub> and O<sub>2</sub>
4. [Cu(NH<sub>3</sub>)<sub>4</sub>]Cl<sub>2</sub> and K<sub>4</sub>[Fe(CN)<sub>6</sub>]

**Options :**

86435199527. 1

86435199528. 2

86435199529. 3

86435199530. 4

**Question Number : 66 Question Id : 86435128770 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The atomic radii of Zr and Hf are almost identical. This is because of

1. change in effective atomic number
2. lanthanoid contraction
3. actinoid contraction
4. usual nature of transition metals

**Options :**

86435199531. 1

86435199532. 2

86435199533. 3

86435199534. 4

**Question Number : 67 Question Id : 86435128771 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

An element has a cubic structure with a cell edge of 288 pm. The density of the element is  $7.2\text{gcm}^{-3}$ . 208 g of the element has  $24.16 \times 10^{23}$  numbers of atoms. The unit cell of this cubic structure is

1. primitive
2. body-centered
3. face-centered
4. hexagonal

**Options :**

86435199535. 1

86435199536. 2

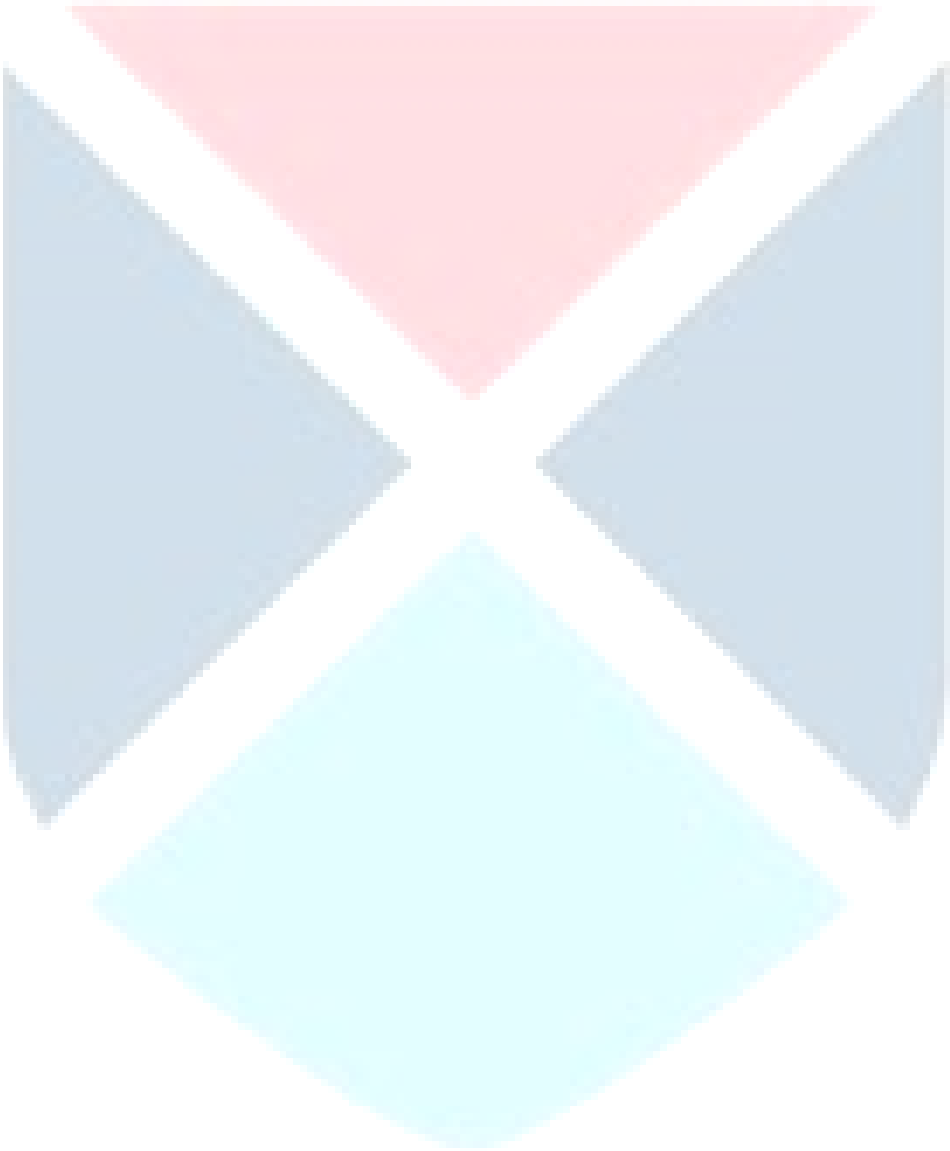
86435199537. 3

86435199538. 4

**Question Number : 68 Question Id : 86435128772 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**





Match List-I with List-II :

List-I	List-II
A. PPM	I. Mol L <sup>-1</sup>
B. Molarity	II. No units
C. Molality	III. Independent of temperature
D. Mole fraction	IV. Very dilute solutions

Choose the correct answer from the options given below :

1. A-IV; B-I; C-III; D-II
2. A-IV; B-II; C-I; D-III
3. A-II; B-I; C-IV; D-III
4. A-IV; B-III; C-II; D-I

**Options :**

86435199539. 1

86435199540. 2

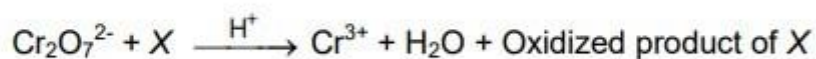
86435199541. 3

86435199542. 4

**Question Number : 69 Question Id : 86435128773 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

In the following reaction, identify X :



1.  $\text{Cr}_2\text{O}_4^{2-}$
2.  $\text{SO}_4^{2-}$
3.  $\text{S}^{2-}$
4.  $\text{Fe}^{2+}$

**Options :**

86435199543. 1



86435199545. 3

86435199546. 4

**Question Number : 70 Question Id : 86435128774 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Dissociation constant and molar conductance of an acetic acid solution are  $1.78 \times 10^{-5} \text{ mol L}^{-1}$  and  $48.15 \text{ S cm}^{-2} \text{ mol}^{-1}$  respectively. The conductivity of the solution is (considering molar conductance at infinite dilution is  $390.5 \text{ S cm}^{-2} \text{ mol}^{-1}$ )

1.  $4.9 \times 10^{-2} \text{ S cm}^{-1}$
2.  $4.9 \times 10^2 \text{ S cm}^{-1}$
3.  $4.9 \times 10^{-5} \text{ S cm}^{-1}$
4.  $4.9 \times 10^5 \text{ S cm}^{-1}$

**Options :**

86435199547. 1

86435199548. 2

86435199549. 3

86435199550. 4

**Question Number : 71 Question Id : 86435128775 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Given below are two statements, one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)** :

**Assertion (A)** : A solution of table salt in a glass of water is homogeneous.

**Reason (R)** : A solution having same composition throughout is heterogeneous.

In the light of the above statements, choose the **most appropriate answer** from the options given below :

1. Both A and R are correct and R is the correct explanation of A
2. Both A and R are correct but R is NOT the correct explanation of A
3. A is correct but R is not correct
4. A is not correct but R is correct

**Options :**

86435199551. 1  
86435199552. 2  
86435199553. 3  
86435199554. 4

**Question Number : 72 Question Id : 86435128776 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which among the following is a false statement?

1. Adsorption is a thermodynamically favorable process
2. Adsorption is an entropically favorable process
3. Adsorption is an enthalpically favorable process
4. Adsorption process is always favorable in dark condition

**Options :**

86435199555. 1  
86435199556. 2  
86435199557. 3  
86435199558. 4

**Question Number : 73 Question Id : 86435128777 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The pOH of a 0.0235 M hydrochloric acid will be

1. 1.629
2. 12.371
3. 2.2
4. 11.8

**Options :**

86435199559. 1

86435199560. 2

86435199561. 3

86435199562. 4

**Question Number : 74 Question Id : 86435128778 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following is the most stable free radical?

1.  $\text{C}_6\text{H}_5\text{-CH}_2\text{-CH}_2^\bullet$
2.  $\text{C}_6\text{H}_5\text{-CH}^\bullet\text{-CH}_3$
3.  $\text{CH}_3\text{-CH}^\bullet\text{-CH}_3$
4.  $\text{C}_6\text{H}_5\text{-CH}_2\text{-CH}_2\text{-CH}_2^\bullet$

**Options :**

86435199563. 1

86435199564. 2

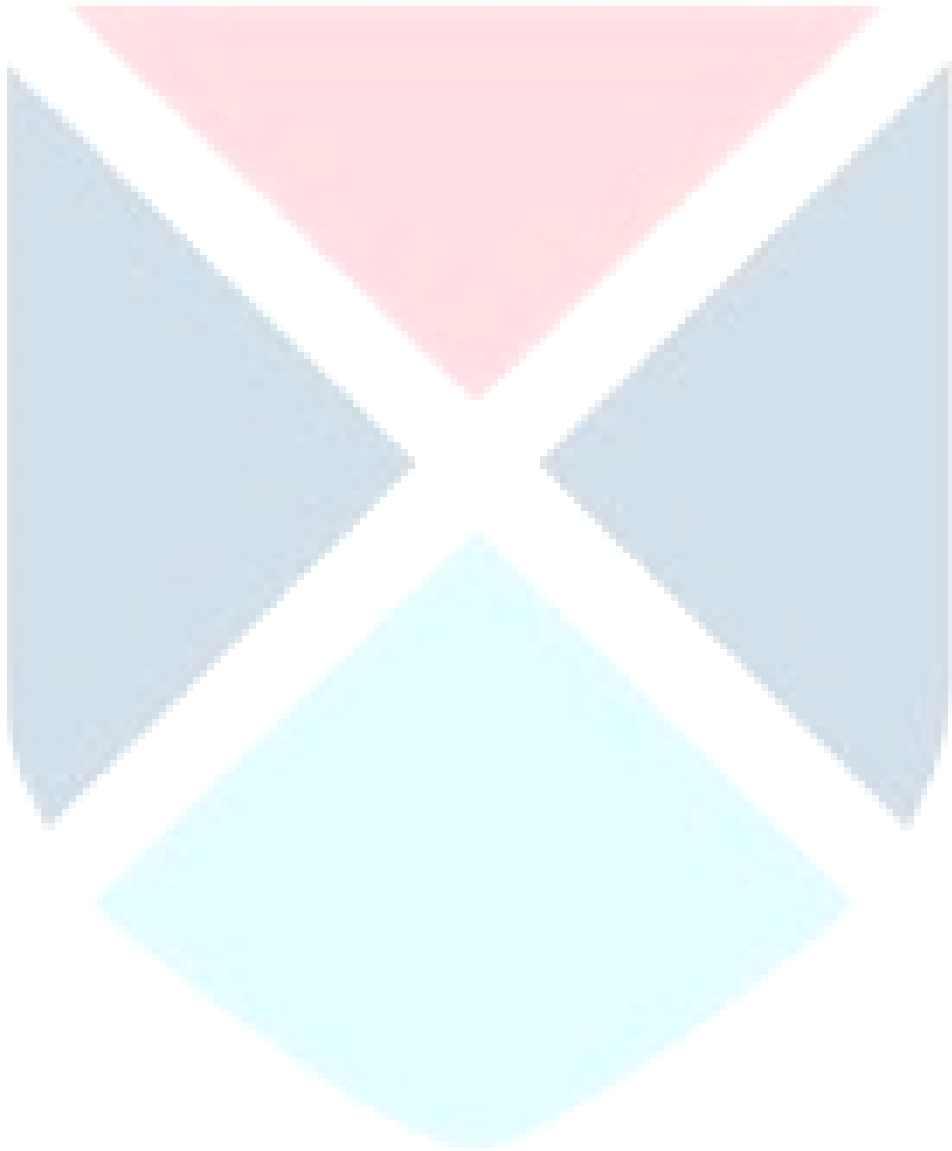
86435199565. 3

86435199566. 4

**Question Number : 75 Question Id : 86435128779 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Upon increase in pressure for dissociation of  $N_2O_4$  into  $NO_2$ , equilibrium shift towards

1. forward direction
2. backward direction
3. no change
4. first in forward direction then in backward direction

**Options :**

86435199567. 1

86435199568. 2

86435199569. 3

86435199570. 4

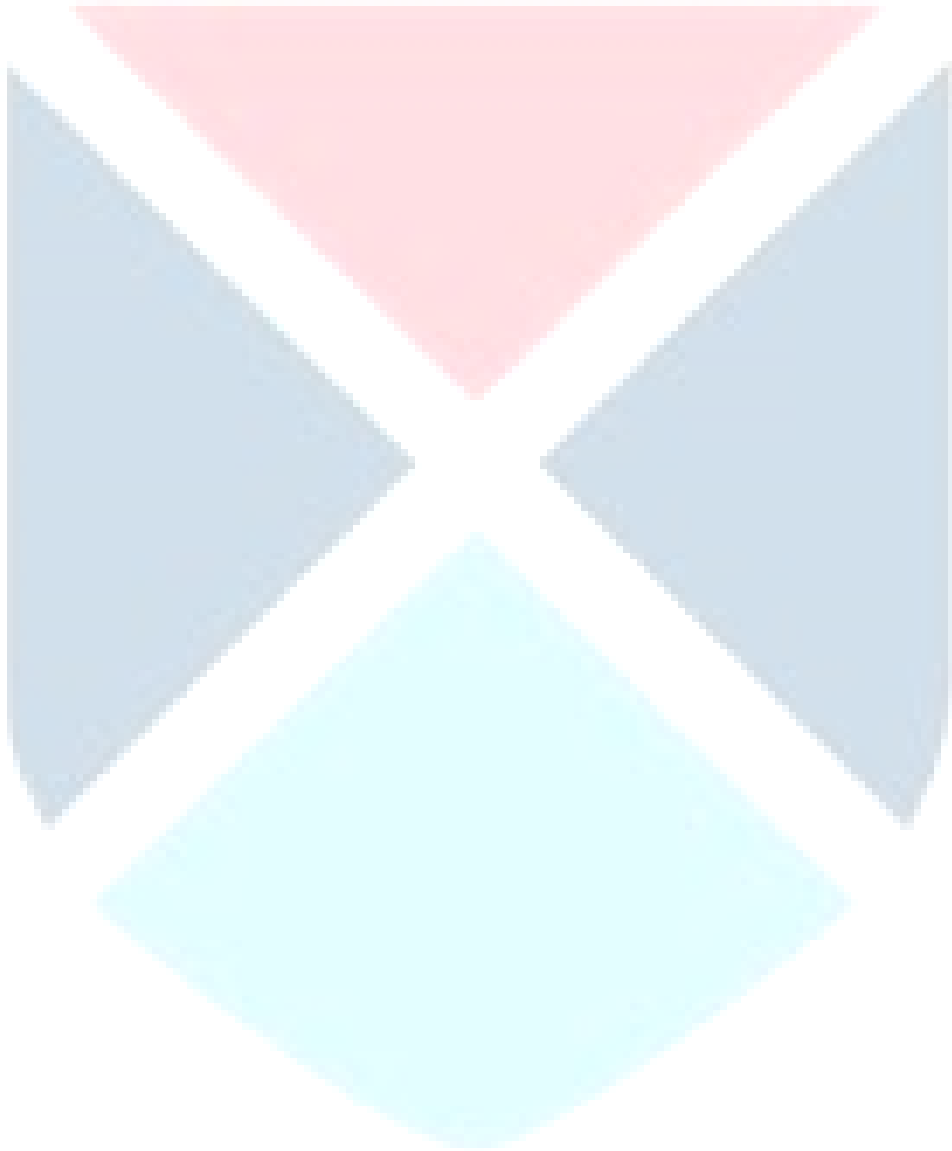
## Part D Mathematics

<b>Section Id :</b>	8643511205
<b>Section Number :</b>	4
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Optional
<b>Number of Questions :</b>	25
<b>Number of Questions to be attempted :</b>	25
<b>Section Marks :</b>	100
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	8643511438
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 76 Question Id : 86435128780 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**





Let  $P$  be any non-empty set containing  $p$  elements. Then, what is the number of relations on  $P$ ?

1.  $2p$
2.  $2^{p^2}$
3.  $p^2$
4.  $p^p$

**Options :**

86435199571. 1

86435199572. 2

86435199573. 3

86435199574. 4

**Question Number : 77 Question Id : 86435128781 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The domain of the function defined by  $f(x) = \log_x 10$  is

1.  $x < 10$  excluding  $x = -10$
2.  $x > 10$
3.  $x \geq 10$
4.  $x > 10$  excluding  $x = 1$

**Options :**

86435199575. 1

86435199576. 2

86435199577. 3

86435199578. 4

**Question Number : 78 Question Id : 86435128782 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $\det M$  denotes the determinant of the matrix  $M$ . Let  $A$  and  $B$  be  $3 \times 3$  matrices with  $\det A = 3$  and  $\det B = 4$ . Then the  $\det (2AB)$  is

1. 24
2. 42
3. 96
4. 48

**Options :**

86435199579. 1

86435199580. 2

86435199581. 3

86435199582. 4

**Question Number : 79 Question Id : 86435128783 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If  $19^{\text{th}}$  term of a non-zero arithmetic progression (AP) is zero, then its  $(49^{\text{th}}$  term) :  $(29^{\text{th}}$  term) is

1. 2 : 1
2. 4 : 1
3. 1 : 3
4. 3 : 1

**Options :**

86435199583. 1

86435199584. 2

86435199585. 3

86435199586. 4

**Question Number : 80 Question Id : 86435128784 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The value of  $k$  for which the system of equations  $x+ky+3z=0$ ,  $4x+3y+kz=0$ ,  $2x+y+2z=0$  has non-trivial solution is

1.  $k=0$  or  $\frac{9}{2}$
2.  $k=10$
3.  $k<9$
4.  $k>0$

**Options :**

86435199587. 1  
86435199588. 2  
86435199589. 3  
86435199590. 4

**Question Number : 81 Question Id : 86435128785 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

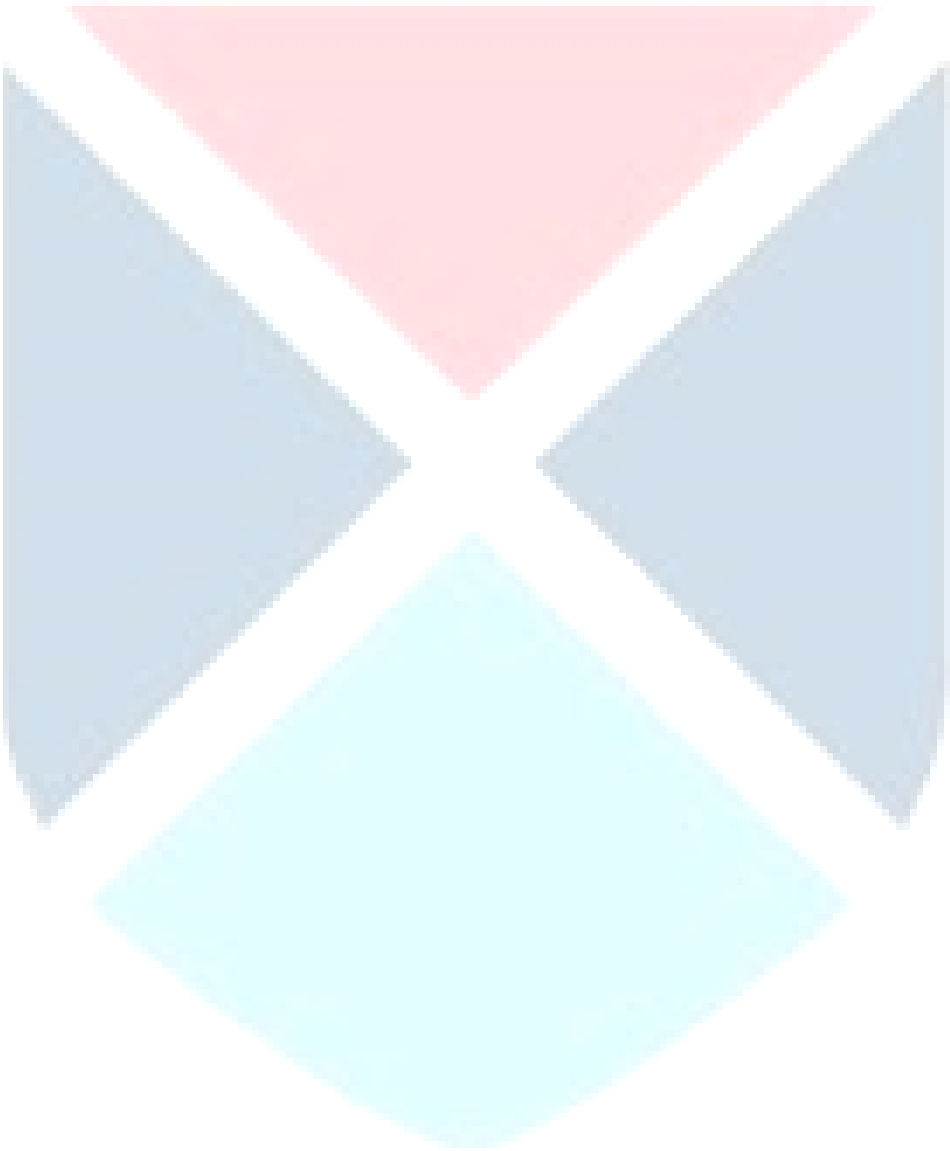
**Correct Marks : 4 Wrong Marks : 1**

A card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is either Ace or a King?

1.  $\frac{4}{13}$
2.  $\frac{1}{13}$
3.  $\frac{2}{13}$
4. None of the above

**Options :**

86435199591. 1  
86435199592. 2  
86435199593. 3  
86435199594. 4



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $E_1$  and  $E_2$  be two independent events. Let  $P(E)$  denotes the probability of the occurrence of the event  $E$ . Further, let  $E'_1$  and  $E'_2$  denote the complements of  $E_1$  and  $E_2$ , respectively. If  $P(E'_1 \cap E_2) = \frac{2}{15}$  and  $P(E_1 \cap E'_2) = \frac{1}{6}$ , then  $P(E_1)$  is

1.  $\frac{2}{15}$
2.  $\frac{13}{15}$
3.  $\frac{2}{13}$
4.  $\frac{1}{5}$

**Options :**

86435199595. 1

86435199596. 2

86435199597. 3

86435199598. 4

**Question Number : 83 Question Id : 86435128787 Question Type : MCQ Option Shuffling : No**

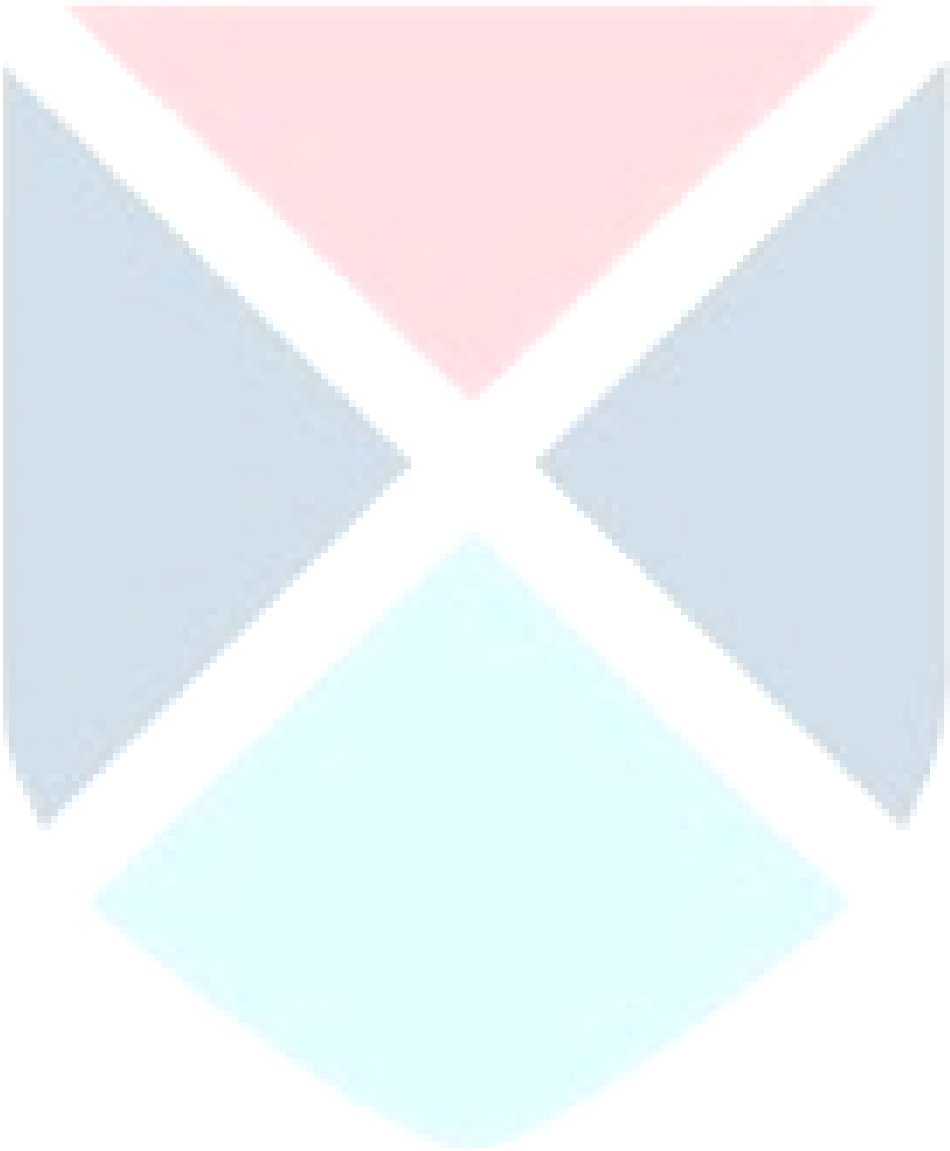
**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If  $a = \frac{2 \sin \theta}{1 + \cos \theta + \sin \theta}$ , then  $\frac{1 + \sin \theta - \cos \theta}{1 + \sin \theta}$  is

1.  $\frac{1}{a}$
2.  $1 - a$
3.  $a$
4.  $1 + a$

**Options :**



86435199599. 1

86435199600. 2

86435199601. 3

86435199602. 4

**Question Number : 84 Question Id : 86435128788 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If  $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$ , then

1.  $x + y + z - xyz = 0$
2.  $xy + yz + zx - 1 = 0$
3.  $x + y + z + xyz = 0$
4.  $xy + yz + zx + 1 = 0$

**Options :**

86435199603. 1

86435199604. 2

86435199605. 3

86435199606. 4

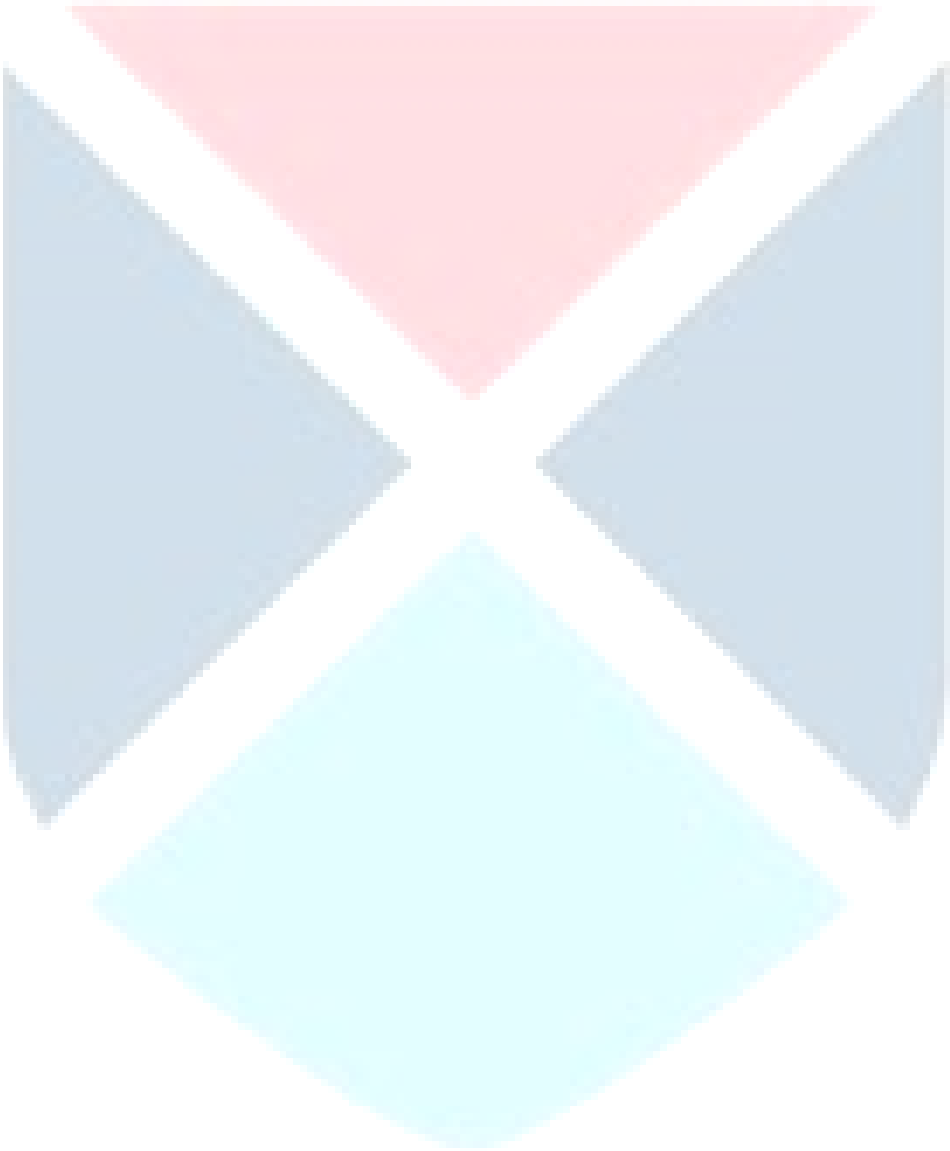
**Question Number : 85 Question Id : 86435128789 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The equation  $ax + by + c = 0$  represents a straight line

1. for all real numbers  $a$ ,  $b$  and  $c$
2. only when  $b \neq 0$
3. only when  $a \neq 0$
4. only when at least one of  $a$  and  $b$  is non-zero

**Options :**





86435199607. 1

86435199608. 2

86435199609. 3

86435199610. 4

**Question Number : 86 Question Id : 86435128790 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The equation of the circle passing through the foci of the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$ ,  
and having centre at (0, 3) is

1.  $x^2 + y^2 - 6y - 5 = 0$

2.  $x^2 + y^2 - 6y + 7 = 0$

3.  $x^2 + y^2 - 6y - 7 = 0$

4.  $x^2 + y^2 - 6y + 5 = 0$

**Options :**

86435199611. 1

86435199612. 2

86435199613. 3

86435199614. 4

**Question Number : 87 Question Id : 86435128791 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $[x^r]$  denotes the greatest integer of  $x^r$  and  $|x|$  denotes the modulus of  $x$ .

Then  $\lim_{x \rightarrow 0} \frac{\sum_{r=1}^{100} [x^r]}{1+|x|}$

1. does not exist
2. is  $-1$
3. is  $1$
4. is  $100$

**Options :**

86435199615. 1  
86435199616. 2  
86435199617. 3  
86435199618. 4

**Question Number : 88 Question Id : 86435128792 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

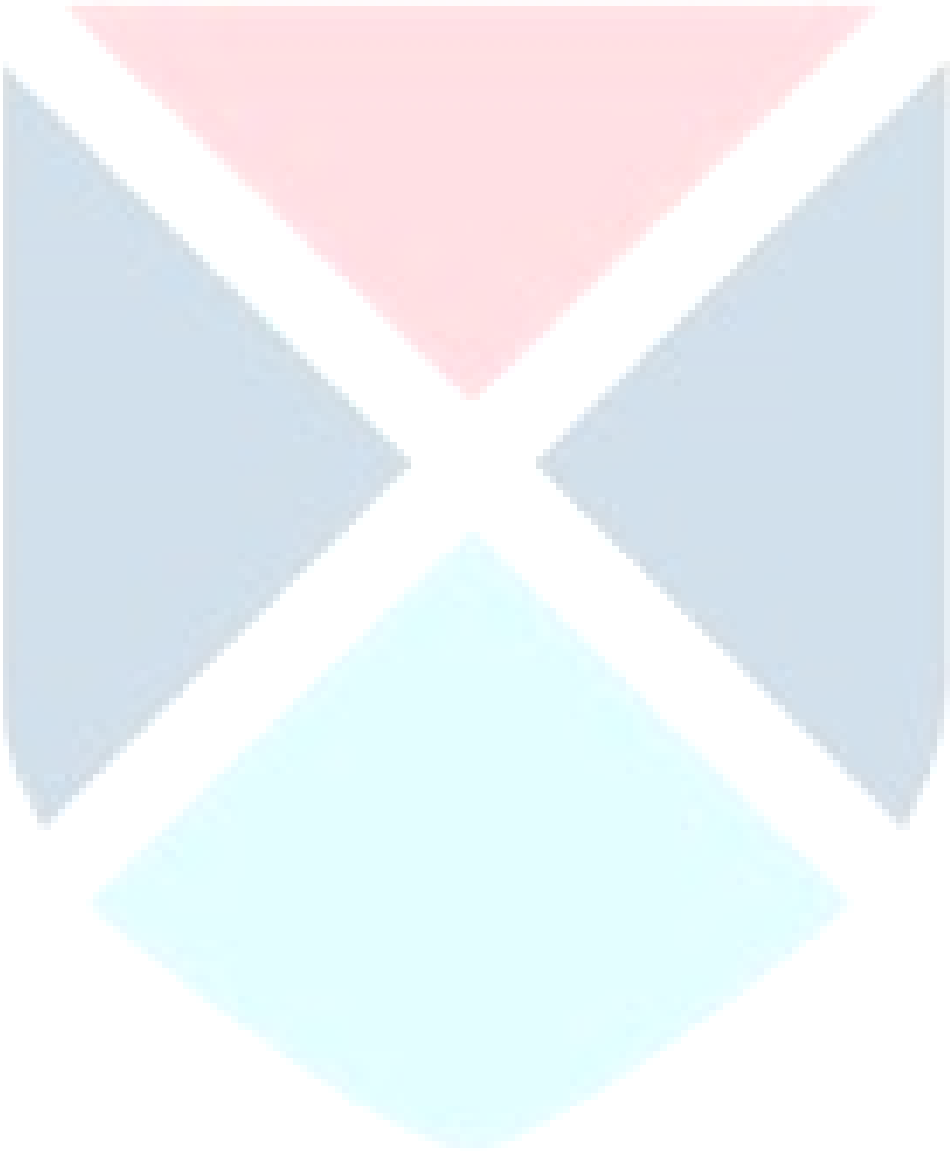
**Correct Marks : 4 Wrong Marks : 1**

If  $f(x) = ax^2 + 6x + 5$  attains its maximum value at  $x = 1$ , then the value of  $a$  is

1.  $0$
2.  $5$
3.  $3$
4.  $-3$

**Options :**

86435199619. 1  
86435199620. 2  
86435199621. 3  
86435199622. 4



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The area of the region bounded by the line  $y = 4$  and the curve  $y = x^2$  is

1.  $\frac{32}{3}$  square units
2. 0 square unit
3. 1 square unit
4. 32 square units

**Options :**

86435199623. 1

86435199624. 2

86435199625. 3

86435199626. 4

**Question Number : 90 Question Id : 86435128794 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The equation of the tangent to the curve given by  $x = a \sin^3 t$ ,  $y = b \cos^3 t$  at a point where  $t = \frac{\pi}{2}$  is

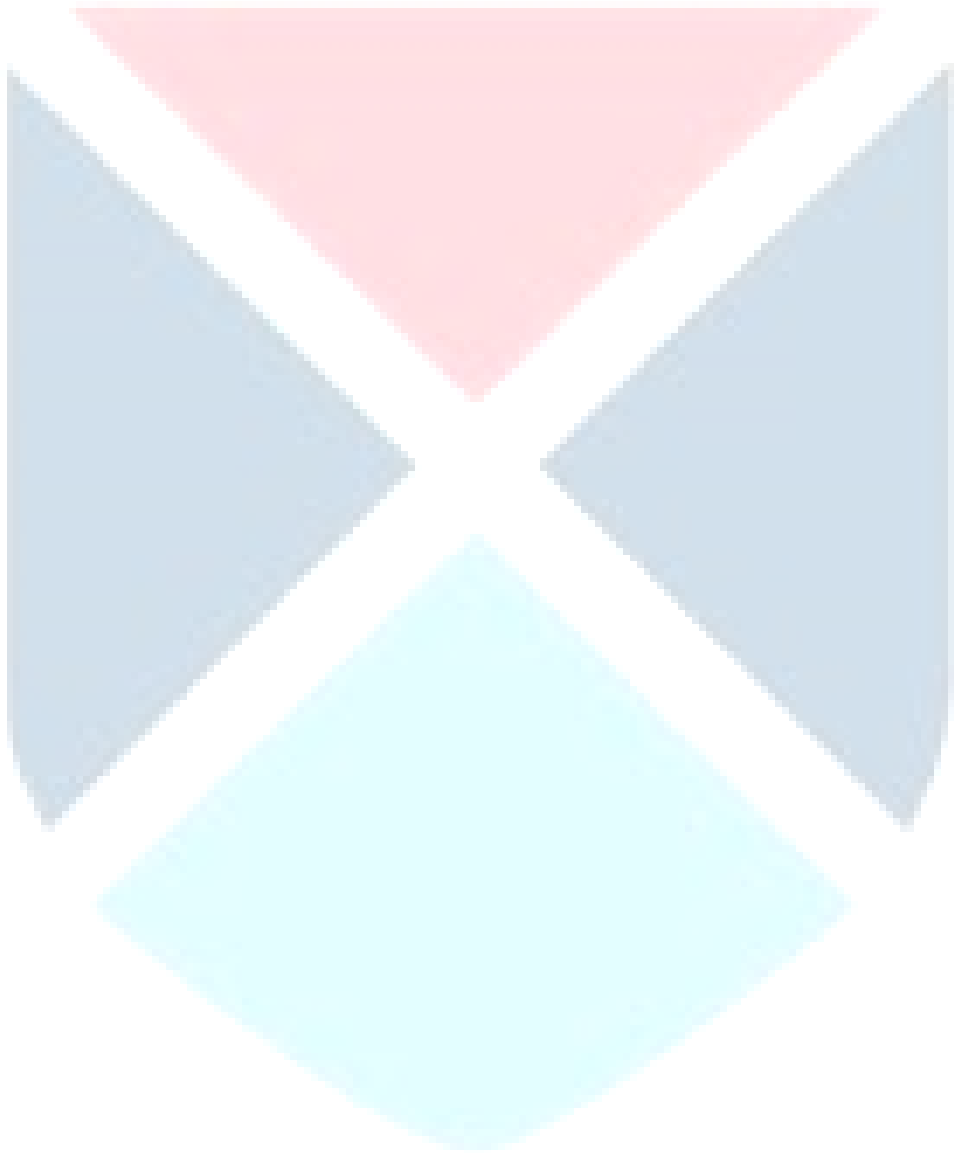
1.  $y = 1$
2.  $y = 0$
3.  $x = 0$
4.  $x = 1$

**Options :**

86435199627. 1

86435199628. 2

86435199629. 3



**Question Number : 91 Question Id : 86435128795 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The solution of the differential equation  $\frac{dx}{dy} + Px = Q$ , where  $P$  and  $Q$  are constants or functions of  $y$ , is given by

1.  $xe^{\int Pdx} = \int Qe^{\int Pdx} dx + c$

2.  $ye^{\int Pdy} = \int Qe^{\int Pdy} dy + c$

3.  $ye^{\int Pdx} = \int Qe^{\int Pdx} dx + c$

4.  $xe^{\int Pdy} = \int Qe^{\int Pdy} dy + c$

**Options :**

86435199631. 1

86435199632. 2

86435199633. 3

86435199634. 4

**Question Number : 92 Question Id : 86435128796 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $\vec{\alpha} = \hat{i} + 2\hat{j} - \hat{k}$ ,  $\vec{\beta} = 2\hat{i} - \hat{j} + 3\hat{k}$ ,  $\vec{\gamma} = 2\hat{i} + \hat{j} + 6\hat{k}$ . If  $\vec{\alpha}$  and  $\vec{\beta}$  are both perpendicular to a vector  $\vec{\delta}$  and  $\vec{\delta} \cdot \vec{\gamma} = 10$ , then the magnitude of  $\vec{\delta}$  is

1.  $\frac{\sqrt{3}}{2}$

2.  $2\sqrt{3}$

3.  $\sqrt{3}$

4.  $\frac{1}{\sqrt{3}}$

**Options :**

86435199635. 1

86435199636. 2

86435199637. 3

86435199638. 4

**Question Number : 93 Question Id : 86435128797 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $\hat{a}$ ,  $\hat{b}$  and  $\hat{c}$  be three unit vectors such that  $\hat{a} \times (\hat{b} \times \hat{c}) = \frac{\sqrt{3}}{2}(\hat{b} + \hat{c})$ . If  $\hat{b}$  is not parallel to  $\hat{c}$ , then the angle between  $\hat{a}$  and  $\hat{c}$  is

1. 0
2.  $2\pi$
3.  $\frac{5\pi}{6}$
4.  $\frac{\pi}{6}$

**Options :**

86435199639. 1

86435199640. 2

86435199641. 3

86435199642. 4

**Question Number : 94 Question Id : 86435128798 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which one of the following statements is correct for a moving body?

1. If its velocity changes, its speed must change and it must have some acceleration
2. If its speed changes, its velocity must change and it must have some acceleration
3. If its speed changes but direction of motion does not change, its velocity will remain constant
4. None of the above

**Options :**

- 86435199643. 1
- 86435199644. 2
- 86435199645. 3
- 86435199646. 4

**Question Number : 95 Question Id : 86435128799 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

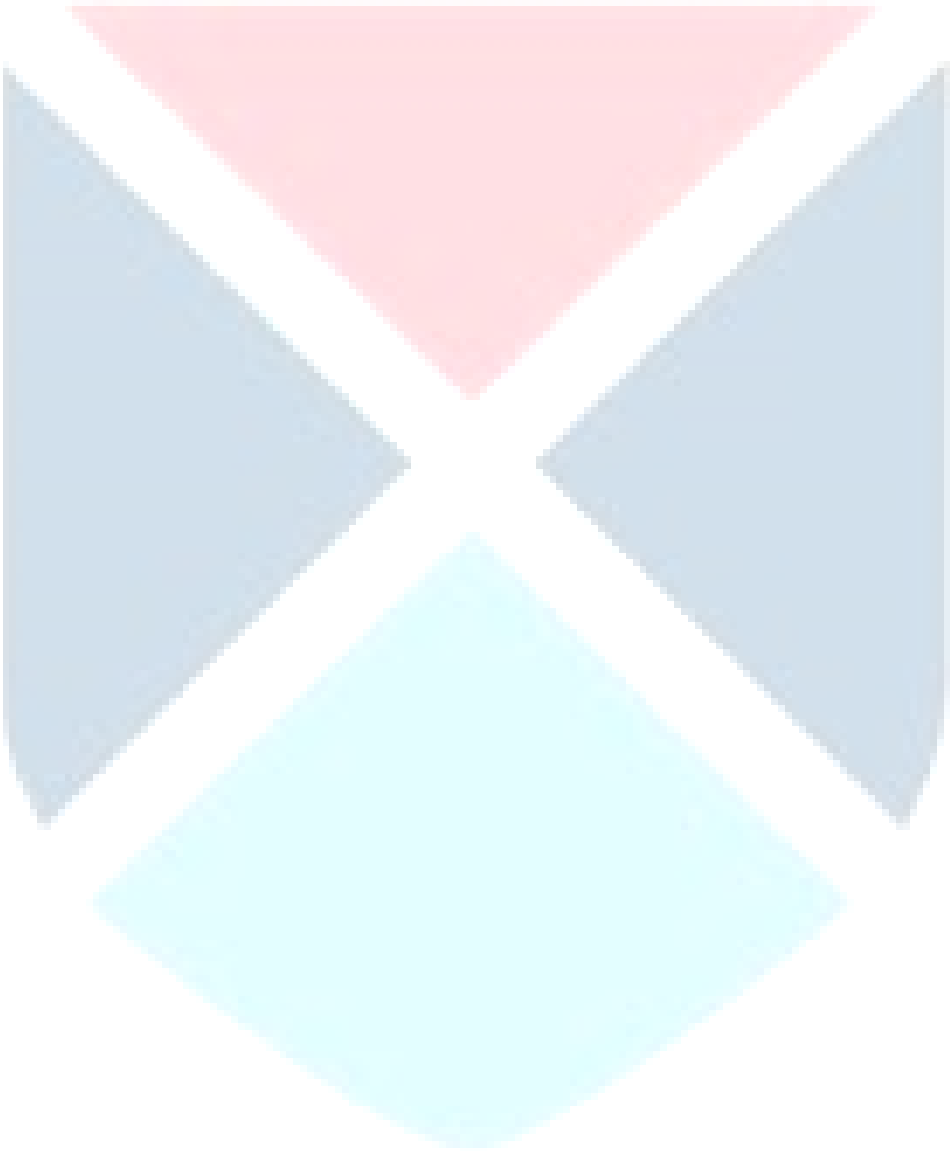
A ball is thrown upward at a speed of 28 meter per second. What is the speed of ball one second before reaching maximum height? (Given that  $g = 10$  meter per second<sup>2</sup>)

1. 10 meter per second
2. 1 meter per second
3. 2 meter per second
4. 18 meter per second

**Options :**

- 86435199647. 1
- 86435199648. 2
- 86435199649. 3
- 86435199650. 4





**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A bullet of mass  $m$  and velocity  $a$  is fired into a large block of wood of mass  $M$ .  
The final velocity of the system is

1.  $\frac{m}{m+M}a$

2.  $\frac{M}{m+M}a$

3.  $\frac{m+M}{m}a$

4.  $\frac{m+M}{M}a$

**Options :**

86435199651. 1

86435199652. 2

86435199653. 3

86435199654. 4

**Question Number : 97 Question Id : 86435128801 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If the horizontal and vertical components of a force are negative, then that force is acting in between

1. North and East

2. North and West

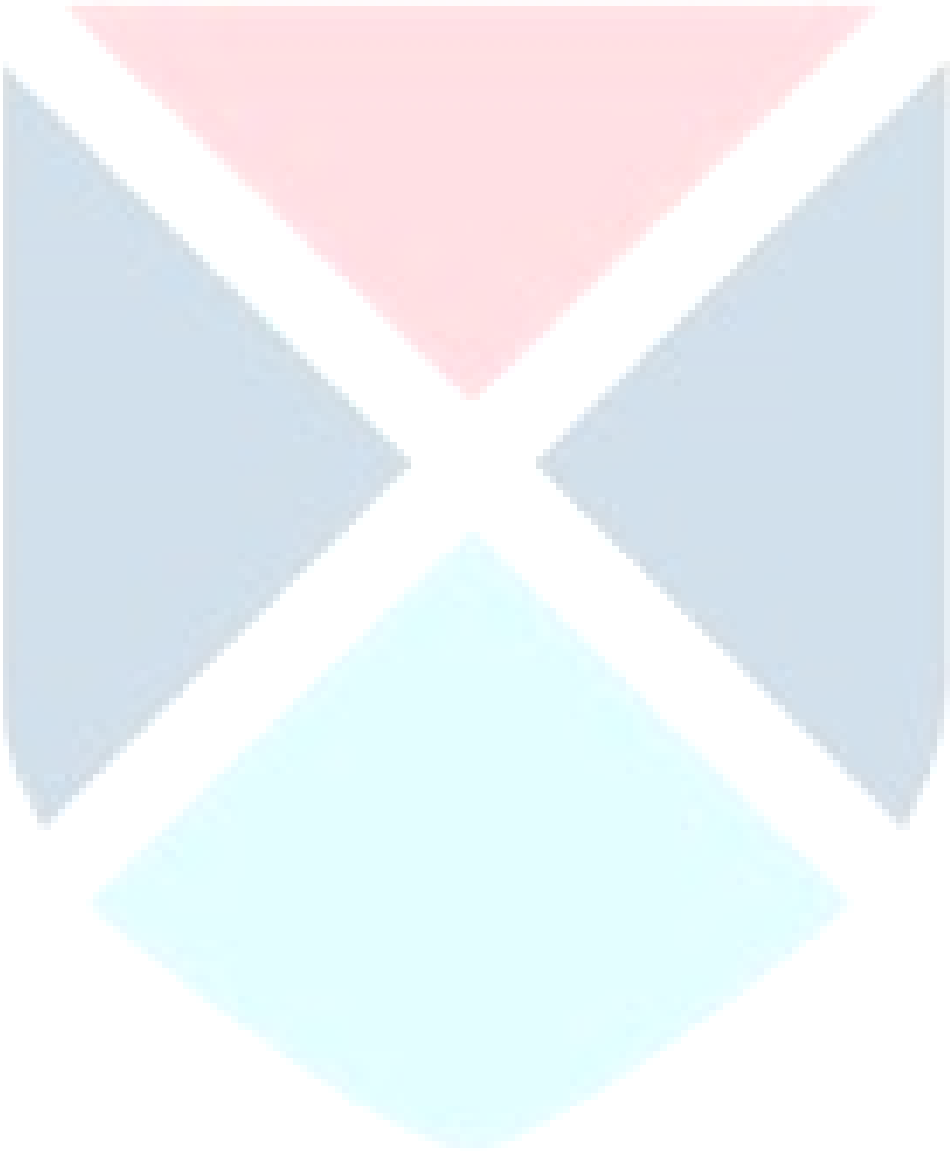
3. South and West

4. South and East

**Options :**

86435199655. 1

86435199656. 2



86435199658. 4

**Question Number : 98 Question Id : 86435128802 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Suppose we have block of 4 kilogram kept on a horizontal surface and we are applying a horizontal force of 10 newton. Let the coefficient of friction is 0.2. Find the force of friction. Assume that  $g = 10$ .

1. 4 newton
2. 8 newton
3. 1 newton
4. None of the above

**Options :**

86435199659. 1  
86435199660. 2  
86435199661. 3  
86435199662. 4

**Question Number : 99 Question Id : 86435128803 Question Type : MCQ Option Shuffling : No**

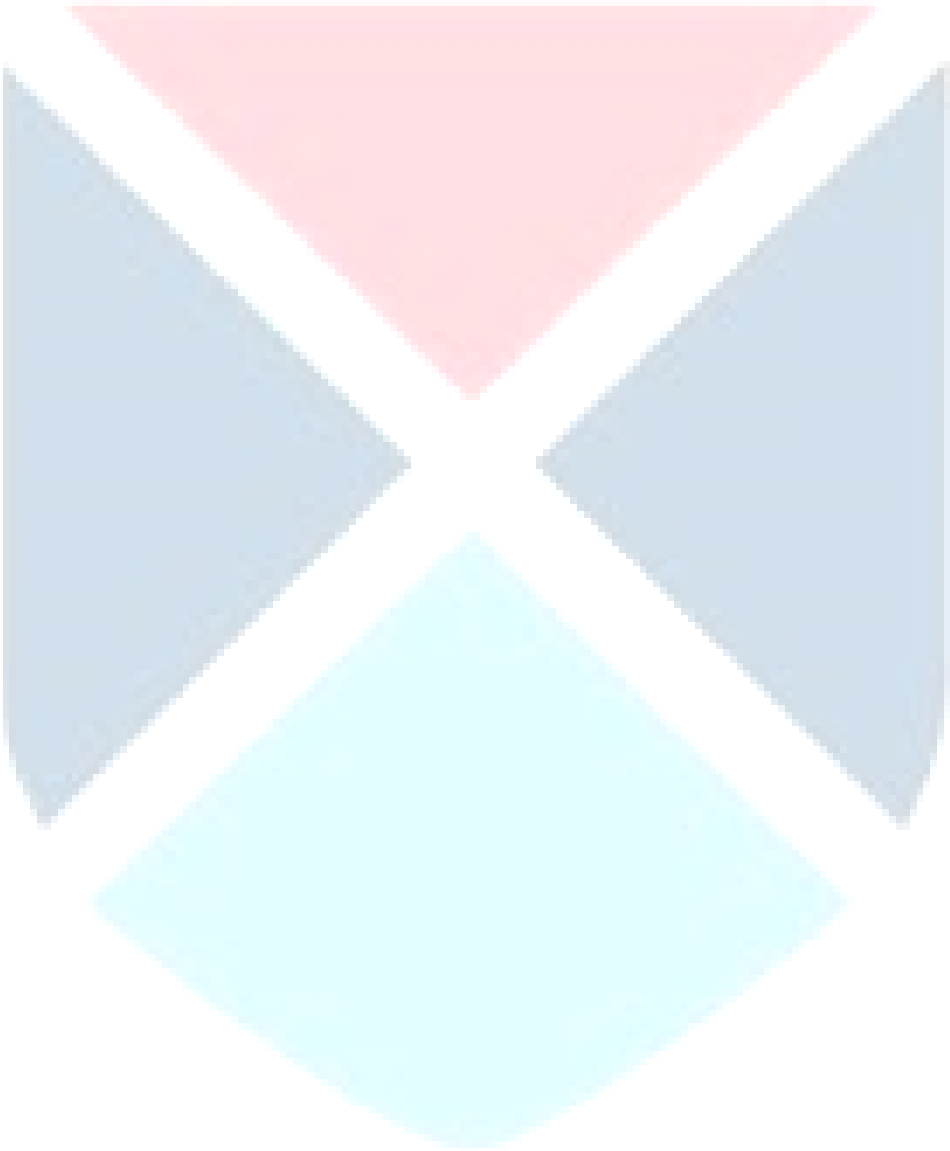
**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The general solution of the differential equation  $\frac{dy}{dx} + \frac{x}{y} = 0$  is

1.  $x^2 + y^2 = cxy$
2.  $x^2 + y^2 = c$
3.  $x^2 - y^2 = c$
4.  $x + y = c$

**Options :**



86435199663. 1

86435199664. 2

86435199665. 3

86435199666. 4

**Question Number : 100 Question Id : 86435128804 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Let  $A = \begin{pmatrix} \cos^2 x & \sin^2 x \\ \sin^2 x & \cos^2 x \end{pmatrix}$  and  $B = \begin{pmatrix} \sin^2 x & \cos^2 x \\ \cos^2 x & \sin^2 x \end{pmatrix}$ . Then the determinant of the matrix  $A + B$  is

1. 1
2. 10
3. 0
4. 2

**Options :**

86435199667. 1

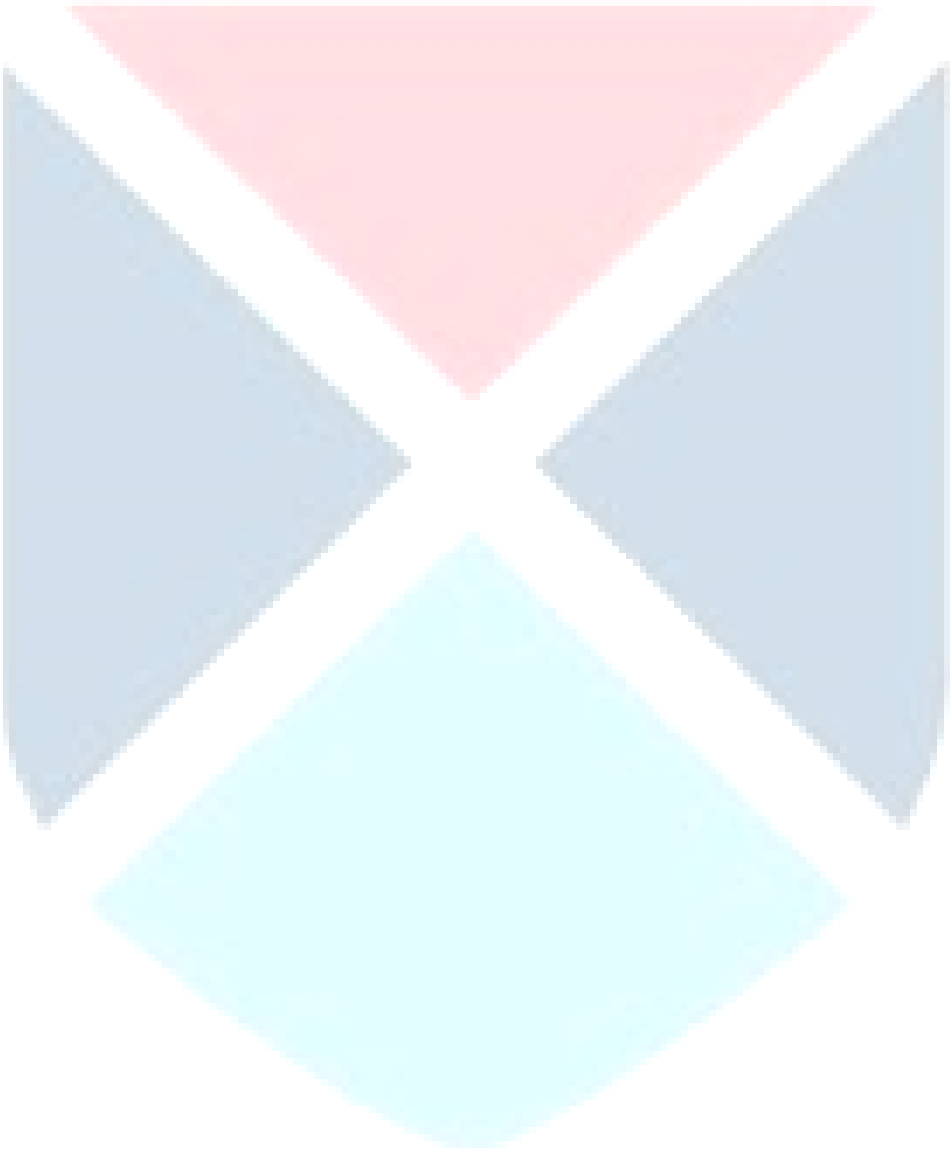
86435199668. 2

86435199669. 3

86435199670. 4

## Part E Biology

<b>Section Id :</b>	8643511206
<b>Section Number :</b>	5
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Optional
<b>Number of Questions :</b>	25
<b>Number of Questions to be attempted :</b>	25



**Enable Mark as Answered Mark for Review and Clear Response :**

Yes

**Sub-Section Number :**

1

**Sub-Section Id :**

8643511439

**Question Shuffling Allowed :**

Yes

**Question Number : 101 Question Id : 86435128805 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following sequences fits into the organic evolution theory proposed by Charles Darwin and Alfred Wallace?

1. Variations, constancy of population size, overproduction, natural selection
2. Variations, overproduction, constancy of population size, natural selection
3. Overproduction, variations, constancy of population size, natural selection
4. Overproduction, constancy of population size, variations, natural selection

**Options :**

86435199671. 1

86435199672. 2

86435199673. 3

86435199674. 4

**Question Number : 102 Question Id : 86435128806 Question Type : MCQ Option Shuffling : No**

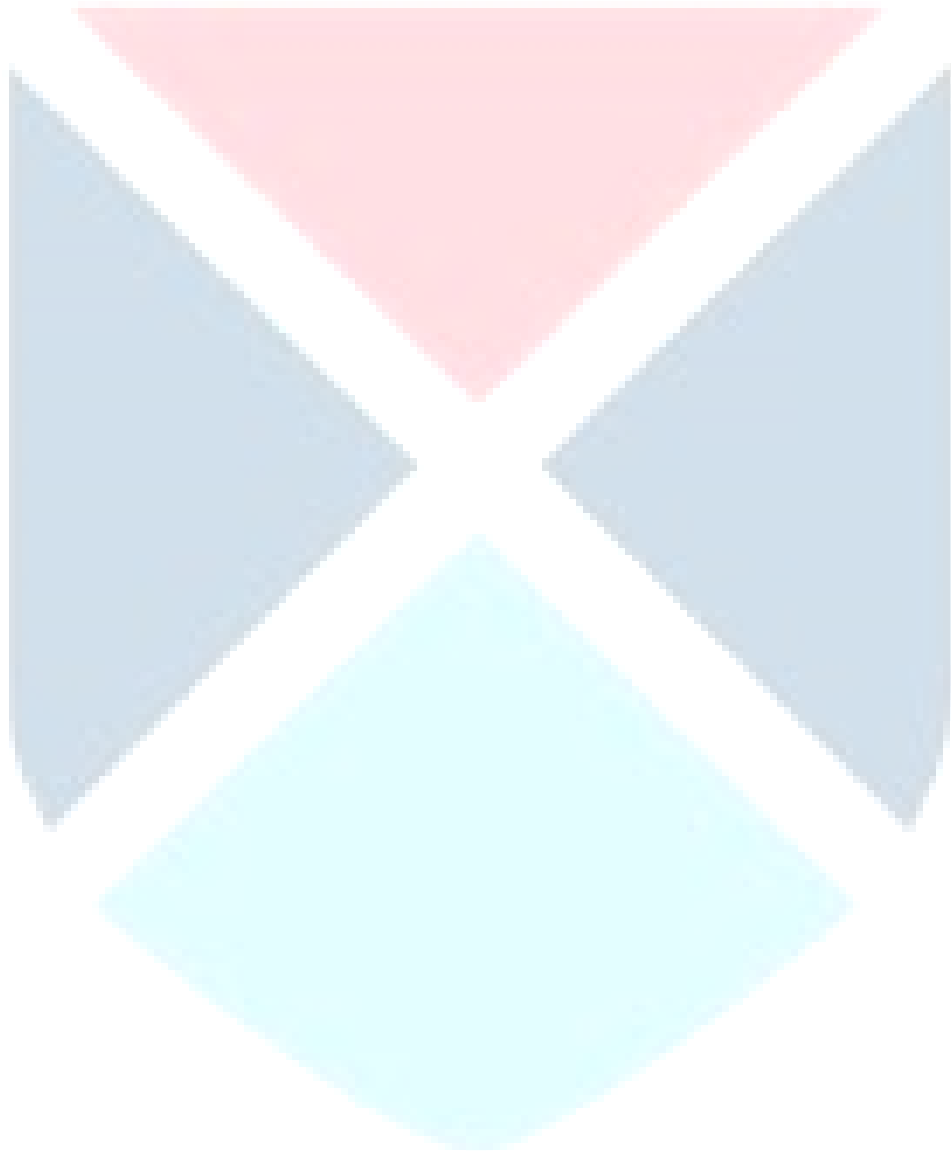
**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**



Which root zone is responsible for maximum water absorption?

1. Root cap
2. Region of elongation
3. Lateral root
4. Root hairs



**Options :**

86435199675. 1

86435199676. 2

86435199677. 3

86435199678. 4

**Question Number : 103 Question Id : 86435128807 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Evolution occurs as a result of mutations in

1. somatic DNA
2. somatic RNA
3. germplasm DNA
4. germplasm RNA

**Options :**

86435199679. 1

86435199680. 2

86435199681. 3

86435199682. 4

**Question Number : 104 Question Id : 86435128808 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Heliophytes are

1. salt-loving plants
2. sun-loving plants
3. shade-loving plants
4. water-loving plants

**Options :**

86435199683. 1

86435199684. 2

86435199685. 3

86435199686. 4

**Question Number : 105 Question Id : 86435128809 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following viruses has the capacity to produce lysozymes?

1. Poliomyelitis virus
2. Bacteriophage
3. TMV
4. Vaccinia virus

**Options :**

86435199687. 1

86435199688. 2

86435199689. 3

86435199690. 4

**Question Number : 106 Question Id : 86435128810 Question Type : MCQ Option Shuffling : No**

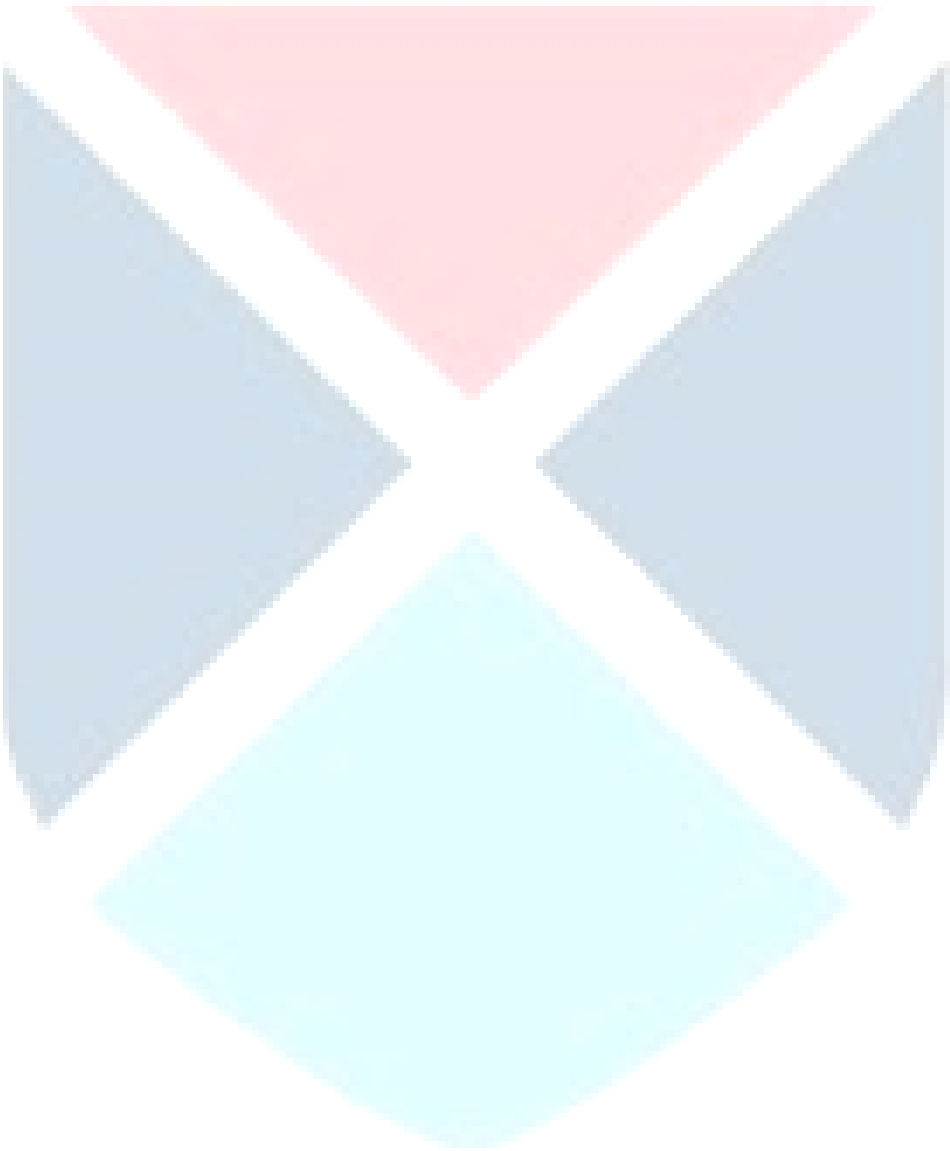
**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Silique is the fruit of the family

1. Cucurbitaceae
2. Malvaceae
3. Brassicaceae
4. Leguminosae

**Options :**



86435199691. 1

86435199692. 2

86435199693. 3

86435199694. 4

**Question Number : 107 Question Id : 86435128811 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

The percent crossing over is high when

1. genes are unlinked
2. genes are located on different chromosomes
3. genes are linked and are very close to each other
4. genes are linked and far away from each other

**Options :**

86435199695. 1

86435199696. 2

86435199697. 3

86435199698. 4

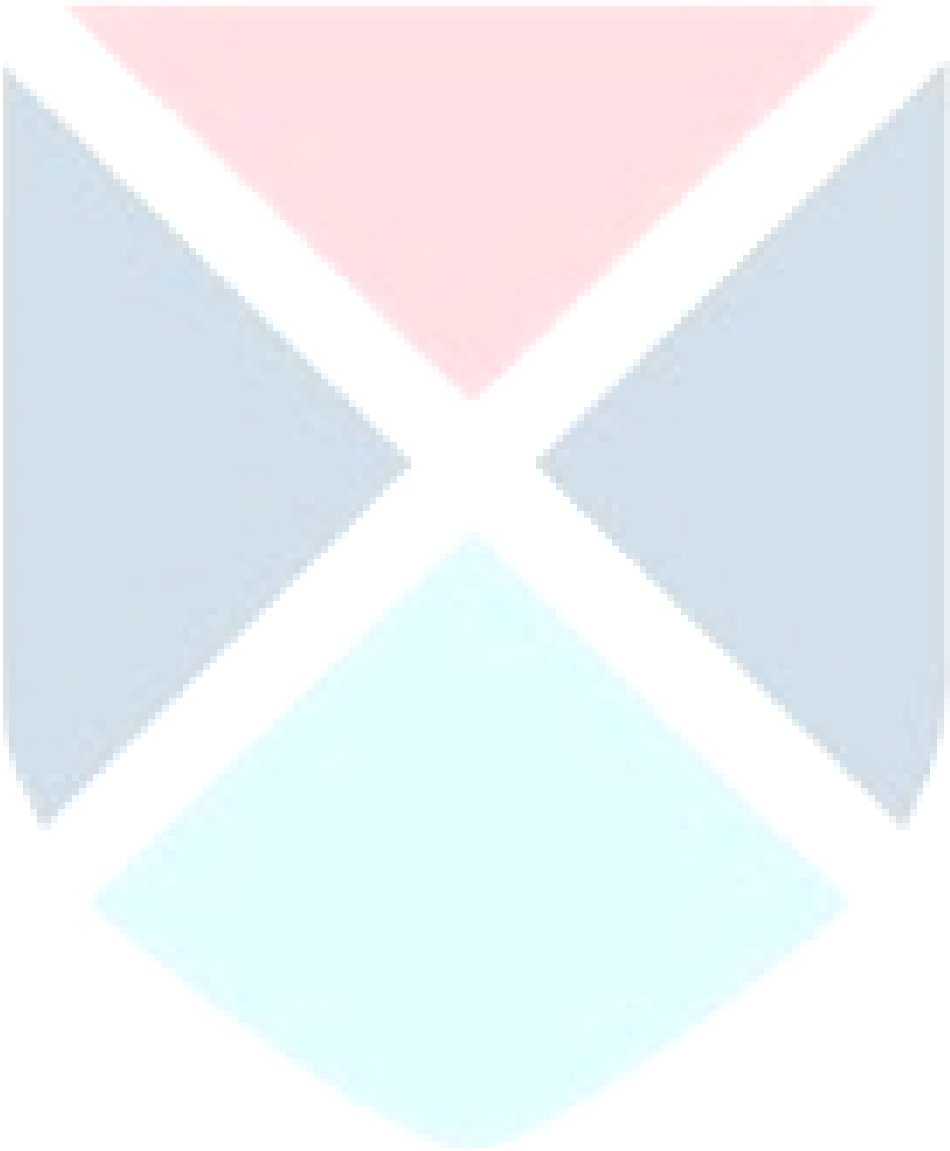
**Question Number : 108 Question Id : 86435128812 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Indole-3-acetic acid (auxin) was first isolated from

1. rice bran oil
2. rhizopus
3. human urine
4. coleoptiles of oat seedlings

**Options :**



86435199700. 2

86435199701. 3

86435199702. 4

**Question Number : 109 Question Id : 86435128813 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Sex in honeybee is determined by

1. X : A ratio
2. the presence of Y chromosome
3. environmental temperature
4. haplodiploidy

**Options :**

86435199703. 1

86435199704. 2

86435199705. 3

86435199706. 4

**Question Number : 110 Question Id : 86435128814 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**

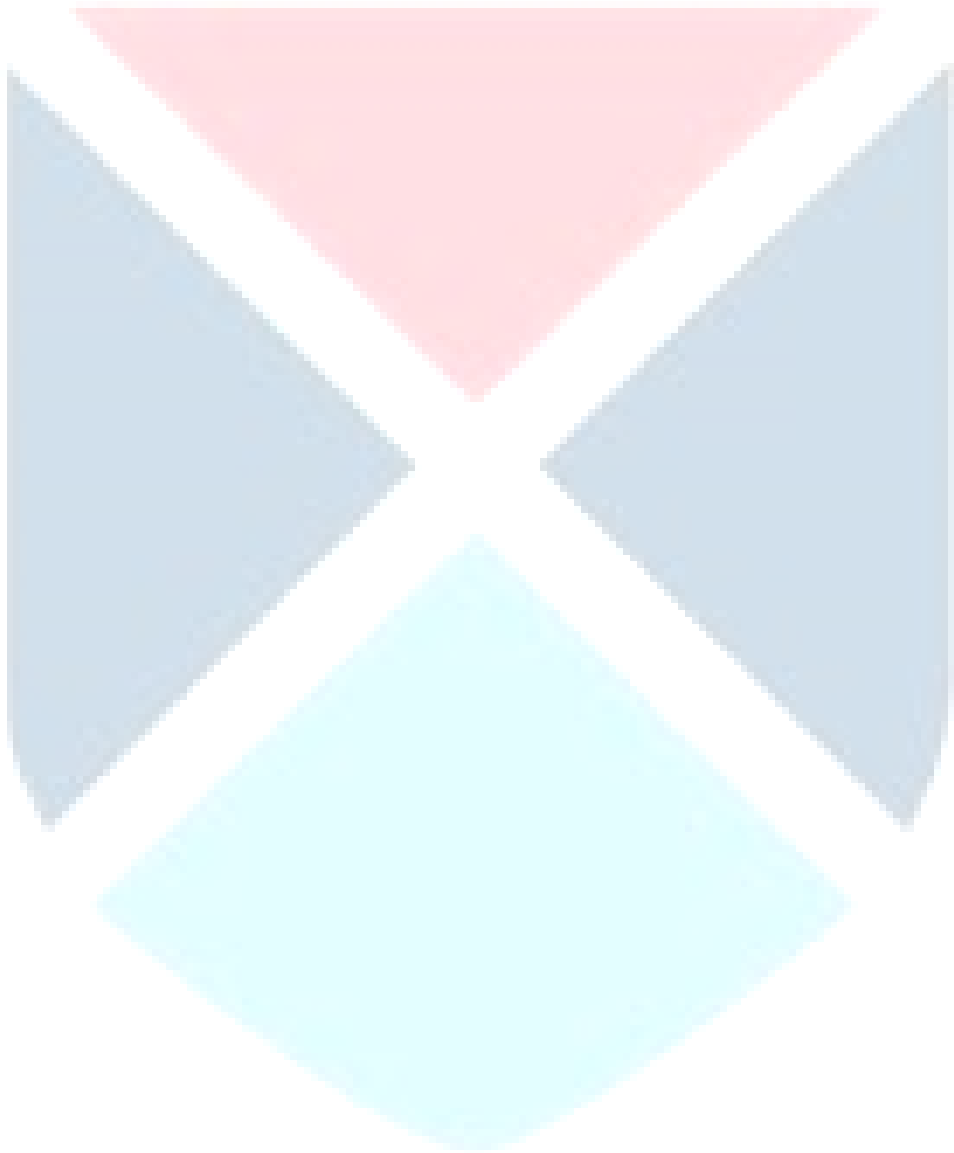
**Correct Marks : 4 Wrong Marks : 1**

Which of the following symbiotic microorganisms is nitrogen fixing?

1. *Azotobacter*
2. *Rhizobium*
3. *Clostridium*
4. Cyanobacteria

**Options :**

86435199707. 1





86435199709. 3

86435199710. 4

**Question Number : 111 Question Id : 86435128815 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which one of the following is the correct match of the product and the producer?

1. Cyclosporin A : *Trichoderma polysporum*
2. Blood cholesterol-lowering statins : *Monascus purpureus*
3. Antibiotics : *Acetobacter aceti*
4. Red dye: Methanobacterium

**Options :**

86435199711. 1

86435199712. 2

86435199713. 3

86435199714. 4

**Question Number : 112 Question Id : 86435128816 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which of the following statements is correct with respect to cellular respiration?

1. Process of glycolysis occurs in cell membrane
2. Enzymes of TCA cycle are present in inner-mitochondrial membrane
3. NAD<sup>+</sup> is the final electron donor for anaerobic respiration
4. Conversion of glucose-6-phosphate to fructose-6-phosphate is a reversible reaction

**Options :**

86435199715. 1



86435199717. 3

86435199718. 4

**Question Number : 113 Question Id : 86435128817 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

What is correct for test tube baby?

1. Fertilization of ova and embryonic development takes place in test tube
2. Fertilization of ova occurs in uterus while the development takes place in test tube
3. Fertilization of ova occurs in test tube whereas development of embryo occurs in uterus
4. Unfertilized ova develops in test tube

**Options :**

86435199719. 1

86435199720. 2

86435199721. 3

86435199722. 4

**Question Number : 114 Question Id : 86435128818 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

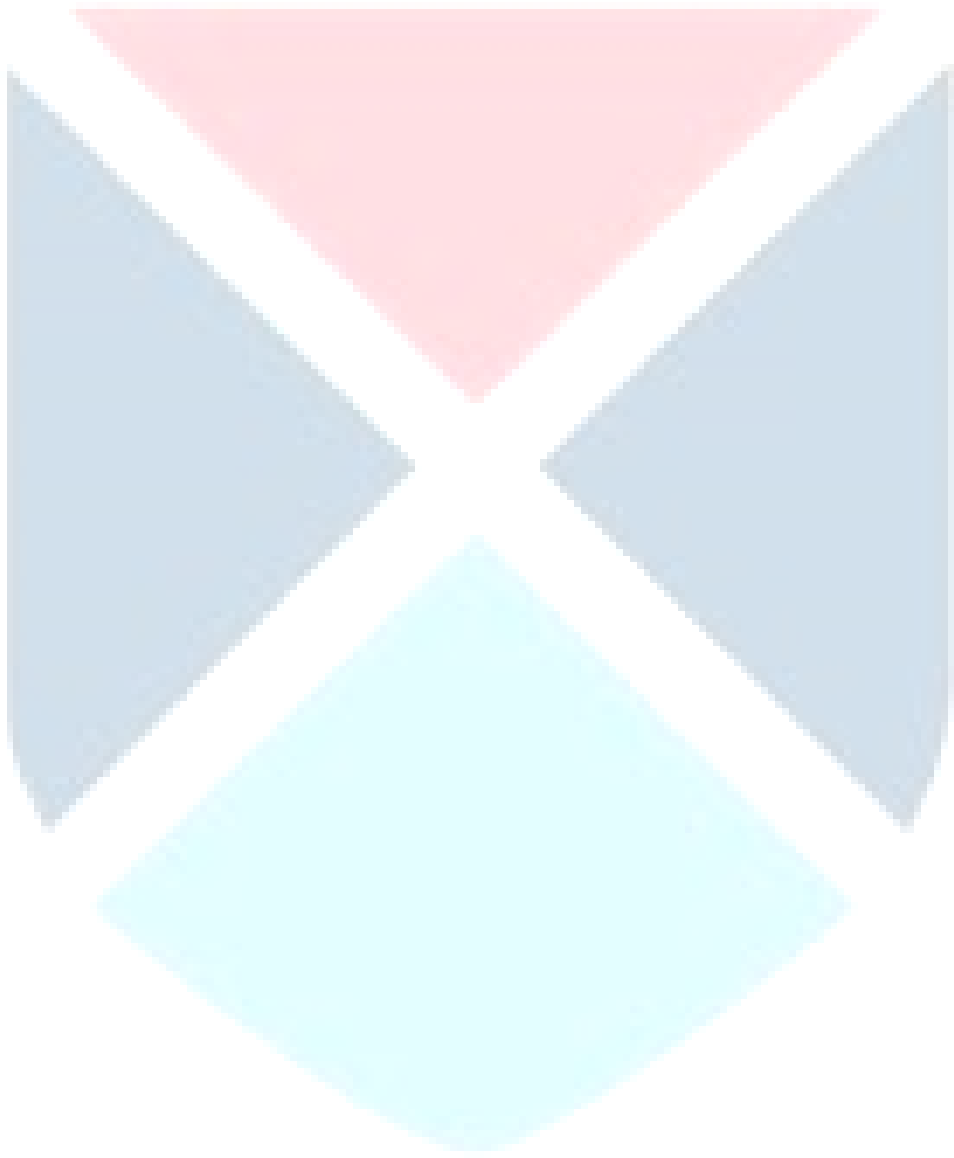
**Correct Marks : 4 Wrong Marks : 1**

Which of the following enzymes helps in fixing CO<sub>2</sub> into malic acid in sorghum plant?

1. RuBP carboxylase
2. PEP carboxylase
3. Pentose phosphatase
4. Fructose phosphatase

**Options :**

86435199723. 1



86435199725. 3

86435199726. 4

**Question Number : 115 Question Id : 86435128819 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Hormones responsible for menstrual cycle are produced from

1. uterus only
2. ovaries only
3. ovaries and anterior pituitary
4. uterus and anterior pituitary

**Options :**

86435199727. 1

86435199728. 2

86435199729. 3

86435199730. 4

**Question Number : 116 Question Id : 86435128820 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

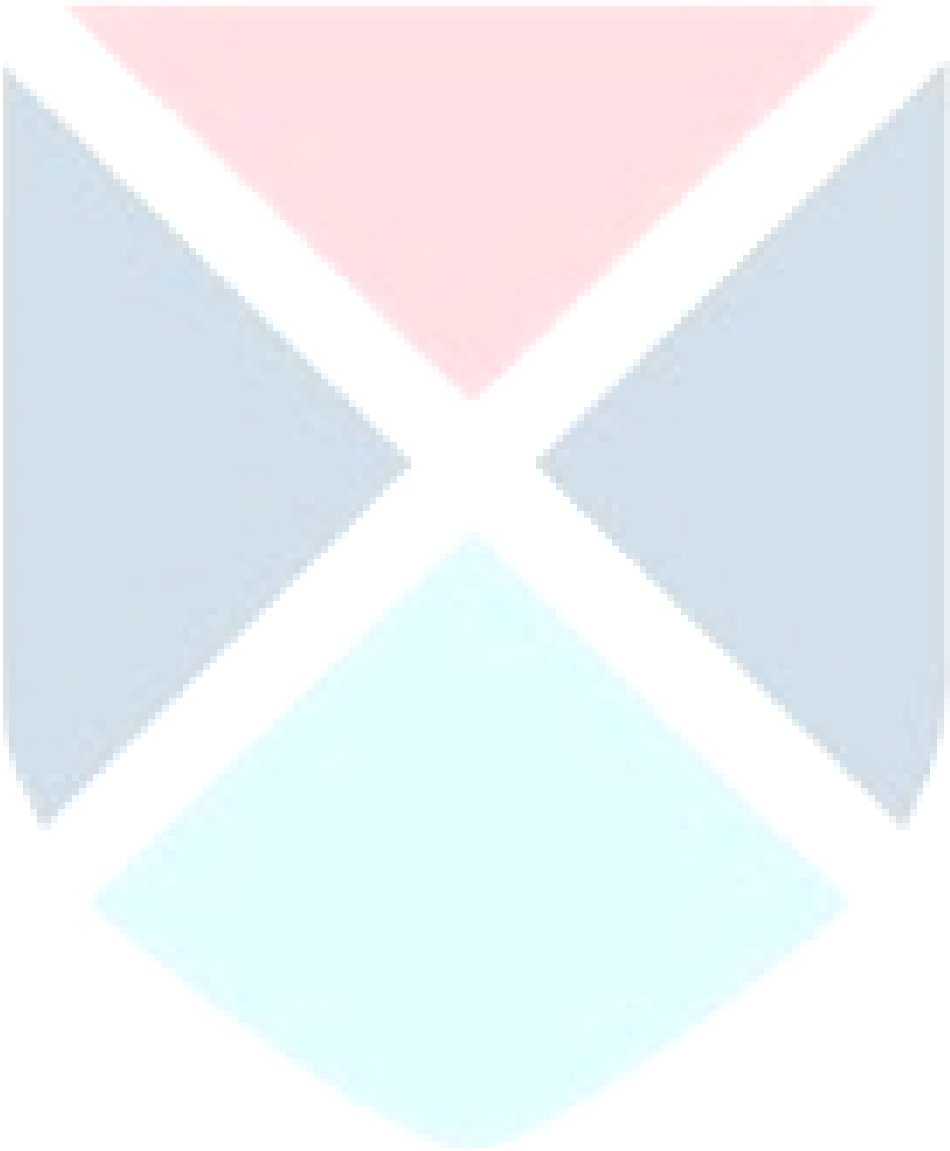
The vascular bundle where vascular cambium is present between xylem and phloem is called

1. collateral open
2. collateral closed
3. bicollateral
4. exarch

**Options :**

86435199731. 1

86435199732. 2



86435199734. 4

**Question Number : 117 Question Id : 86435128821 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Production of which of the following is stimulated by secretin hormone?

1. Bile juice
2. Pancreatic juice
3. Gastric juice
4. Intestinal juice

**Options :**

86435199735. 1

86435199736. 2

86435199737. 3

86435199738. 4

**Question Number : 118 Question Id : 86435128822 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Lateral conjugation in *Spirogyra* takes place in the cells of

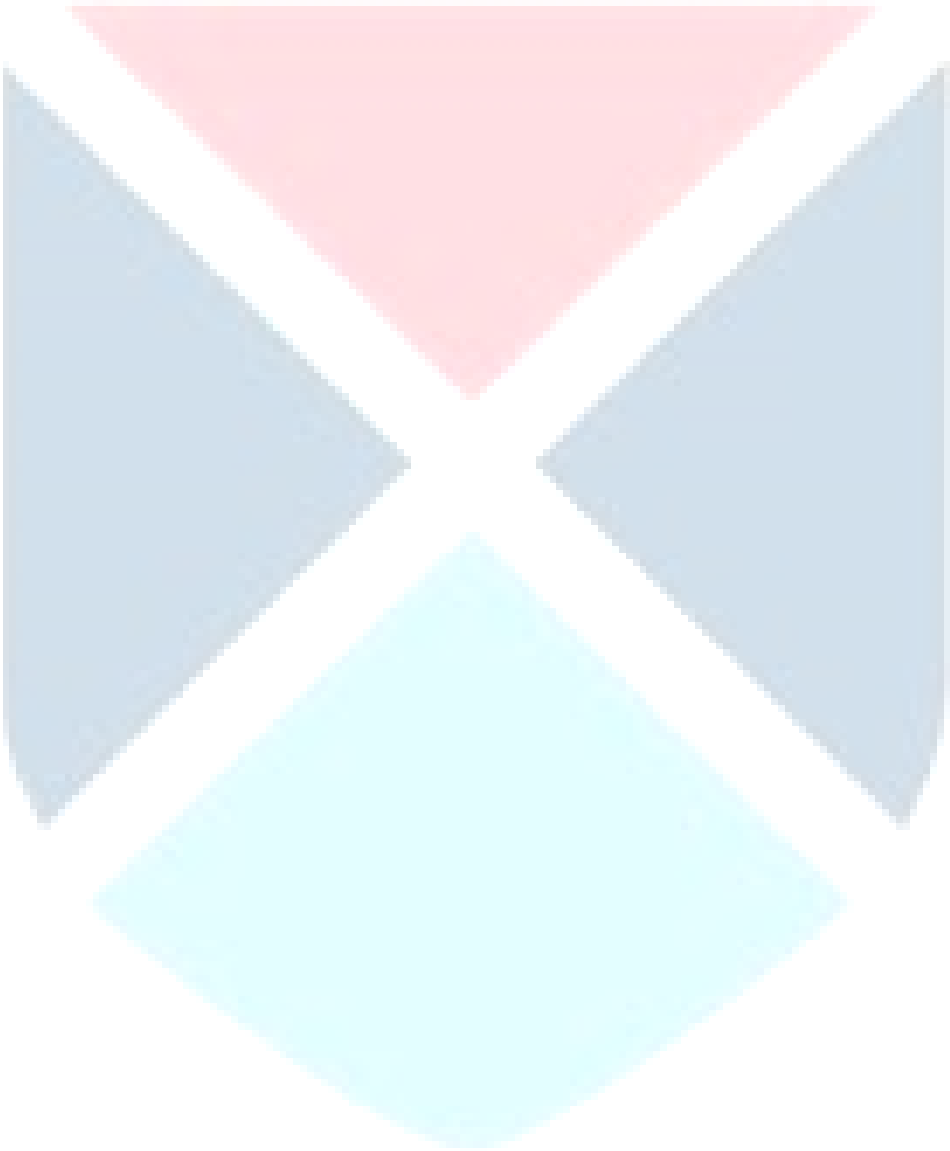
1. same filament
2. two filaments of same species
3. two filaments of different species
4. All of the above

**Options :**

86435199739. 1

86435199740. 2

86435199741. 3





**Question Number : 119 Question Id : 86435128823 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

In which part of mitochondria is the Electron Transport System (ETS) located?

1. Inner membrane
2. Outer membrane
3. Intermembrane space
4. Cristae

**Options :**

86435199743. 1

86435199744. 2

86435199745. 3

86435199746. 4

**Question Number : 120 Question Id : 86435128824 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Diffusion of gases over the respiratory surface occurs because of

1. the  $p\text{CO}_2$  is more in alveoli than in blood
2. the  $p\text{CO}_2$  is more in blood than in tissues
3. the  $p\text{O}_2$  is more in alveoli than in blood
4. the  $p\text{O}_2$  is more in tissues than in blood

**Options :**

86435199747. 1

86435199748. 2

86435199749. 3

86435199750. 4

**Question Number : 121 Question Id : 86435128825 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Seed dispersal in squirting cucumber occurs via

1. wind
2. water
3. ballistic mechanism
4. animal consumption

**Options :**

86435199751. 1

86435199752. 2

86435199753. 3

86435199754. 4

**Question Number : 122 Question Id : 86435128826 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

A patient suffering from diabetes mellitus will have

1. ketonuria and glycosuria
2. uremia and renal calculi
3. hyperglycemia
4. uremia and ketonuria

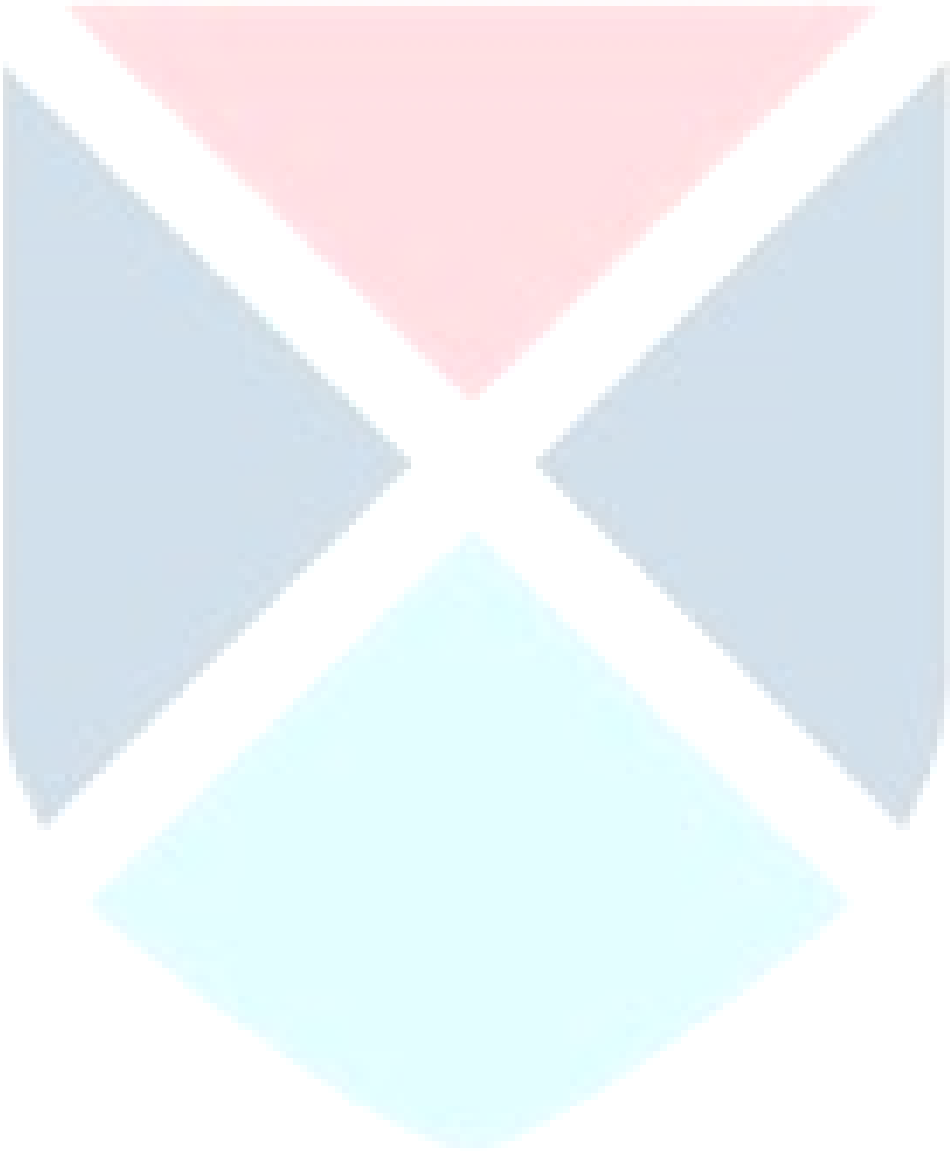
**Options :**

86435199755. 1

86435199756. 2

86435199757. 3

86435199758. 4



**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

What does low hematocrit value represent?

1. More lymphocytes in blood than what's considered to be healthy
2. Less lymphocytes in blood than what's considered to be healthy
3. More RBCs in blood than what's considered to be healthy
4. Less RBCs in blood than what's considered to be healthy

**Options :**

86435199759. 1

86435199760. 2

86435199761. 3

86435199762. 4

**Question Number : 124 Question Id : 86435128828 Question Type : MCQ Option Shuffling : No**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Which part of the brain extends to form spinal cord?

1. Medulla
2. Cerebrum
3. Cerebellum
4. Hippocampus

**Options :**

86435199763. 1

86435199764. 2

86435199765. 3

86435199766. 4

**Question Number : 125 Question Id : 86435128829 Question Type : MCQ Option Shuffling : No  
Is Question Mandatory : No**



**Correct Marks : 4 Wrong Marks : 1**

Which group features 'jointed appendages'?

1. Coelenterata
2. Porifera
3. Aschelminthes
4. Arthropoda

**Options :**

86435199767. 1

86435199768. 2

86435199769. 3

86435199770. 4

