

# FIITJEE RET – 9

EXTENDED\_2019

IIT-2015 (P2)

DATE: 08.10.2018

Time: 3 hours

Maximum Marks: 240

## INSTRUCTIONS:

### A. General

1. This booklet is your Question Paper containing 60 questions.
2. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. Fill in the boxes provided for Name and Enrolment No.
4. The answer sheet, a machine-readable Objective Response (ORS), is provided separately.
5. DO NOT TAMPER WITH / MULTILATE THE ORS OR THE BOOKLET.

### B. Filling in the OMR:

6. The instructions for the OMR sheet are given on the OMR itself.

### C. Question paper format:

7. The question paper consists of **3 parts (Physics, Chemistry and Mathematics)**. Each part consists of **two sections**.
8. **Section I** contains **8 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).
9. **Section II** contains **8 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE** are correct.
10. **Section III** contains **2 paragraphs** type questions. Each paragraph describes an experiment, a situation or a problem. Two multiple choice questions will be asked based on this paragraph. One or more than one option can be correct.

### D. Marking Scheme

11. For each question in **Section I**, you will be awarded **4 marks** if you darken ALL the bubble(s) corresponding to the correct answer(s) **ONLY**. In all other cases **zero (0) marks** will be awarded. **No negative marks** will be awarded for incorrect answers in this section.
12. For each question in **Section II**, you will be awarded **4 marks** if you darken ALL the bubble(s) corresponding to the correct answer(s) **ONLY**. In all other cases **zero (0) marks** will be awarded. **-2 marks** will be awarded for incorrect answers in this section.
13. For each question in **Section III**, you will be awarded **4 marks** if you darken ALL the bubble(s) corresponding to the correct answer(s) **ONLY**. In all other cases **zero (0) marks** will be awarded. **-2 marks** will be awarded for incorrect answers in this section.

Don't write / mark your answers in this question booklet.

If you mark the answers in question booklet, you will not be allowed to continue the exam.

NAME:

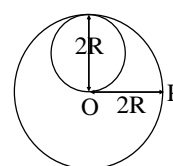
ENROLLMENT NO.:

**PAPER – II**  
**PART I: PHYSICS**  
**SECTION 1 (Maximum Marks: 32)**

- ◆ This section contains **EIGHT** questions
- ◆ The answer to each question is a **SINGLE DIGIT INTEGER** ranging from **0 to 9**, both inclusive
- ◆ For each question, darken the bubble corresponding to the correct integer in the ORS
- ◆ **Marking scheme:**
  - +4** If the bubble corresponding to the answer is darkened
  - 0** In all other cases

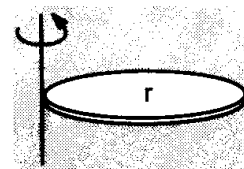
1. A rigid body can be hinged about any point on  $x$ -axis. When it is hinged at  $x$ , moment of inertia about axis through hinge is given by  $I = 3x^2 - 18x + 15$ .  $x$ -coordinate of centre of mass is \_\_\_\_\_

2. A lamina is made by removing a small disc of diameter  $2R$  from a bigger disc of uniform mass density and radius  $2R$ , as shown in the figure. the moment of inertia of this lamina about axes passing through  $O$  and  $P$  is  $I_O$  and  $I_P$ , respectively. Both these axes are perpendicular to the plane of the lamina. The ratio  $\frac{I_P}{I_O}$  to the nearest integer is

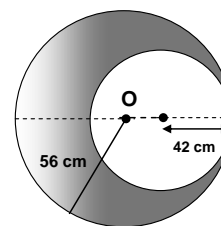


3. Four solid spheres each of diameter  $\sqrt{5}$  cm and mass 0.5 kg are placed with their centres at the corners of a square of side 4 cm. The moment of inertia of the system about the diagonal of the square is  $N \times 10^{-4}$  kg  $m^2$ , then  $N$  is

4. A solid sphere of radius  $R$  has moment of inertia  $I$  about its geometrical axis. It is melted into a disc of radius  $r$  and thickness  $t$ . If its moment of inertia about the tangential axis (which is perpendicular to plane of the disc) is also equal to  $I$ , then the value of  $r = \frac{k}{\sqrt{15}} R$ . Find  $K$ .

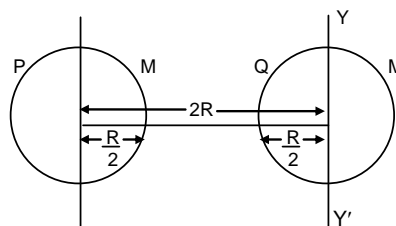


5. A circular plate of uniform thickness has a radius of 56 cm. A circular portion of radius 42 cm is removed from one edge of the plate as shown. At what distance (in cm) to the left from the centre of the disc is the centre of mass of the remaining portion?

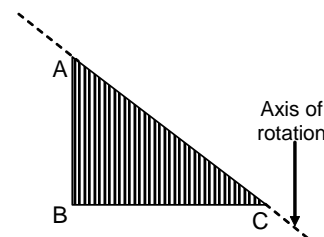


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6. Two spheres each of mass  $M$  and radius  $R/2$  are connected with a massless rod of length  $2R$  as shown in the figure. The moment of inertia of the system about an axis passing through the centre of one of the spheres and perpendicular to the rod is  $\left(\frac{3}{5}C\right)MR^2$  where 'C' is equal to



7. A wire of length  $l$  and mass  $m$  is bent in the form of a rectangle ABCD) with  $\frac{AB}{BC} = 2$ . The moment of inertia of this wire frame about the side BC is  $\frac{k}{162}m l^2$ , where  $k$  is equal to
8. A thin uniform metallic triangular sheet of mass  $M$  has sides  $AB = BC = 2L$ . Its moment of inertia about axis AC lying in the plane of the sheet is  $\frac{ML^2}{\alpha}$ . Find the value of  $\alpha$

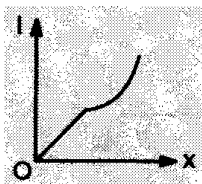


### SECTION 2 (Maximum Marks: 32)

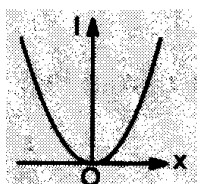
- ◆ This section contains **EIGHT** questions
- ◆ Each question has FOUR options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- ◆ **Marking scheme:**
  - +4** If only the bubble(s) corresponding to all the correct option(s) is(are) darkened
  - 0** If none of the bubbles is darkened
  - 2** In all other cases

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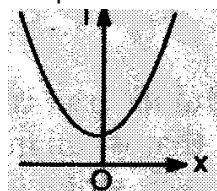
9. If  $I$  represents the M.I of a solid sphere about an axis parallel to the diameter of the solid sphere at a distance  $x$  from it, then which of the following graphs represents the variation of  $I$  with  $x$  ?



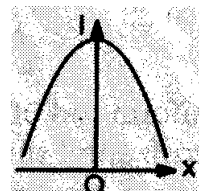
(A)



(B)



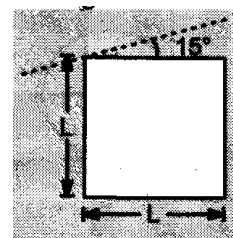
(C)



(D)

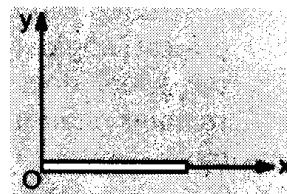
10. A square plate of mass  $M$  and edge  $l$  is shown in figure. The moment of inertia of the plate about the axis in the plane of plate and passing through one of its vertex making an angle  $15^\circ$  from horizontal is :

- (A)  $\frac{ML^2}{12}$  (B)  $\frac{29ML^2}{24}$   
 (C)  $\frac{7ML^2}{12}$  (D) None of these



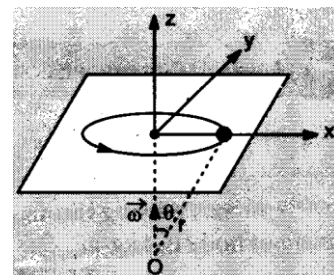
11. The fig. shown a uniform rod lying along the  $x$ -axis. The locus of all the points lying on the  $xy$ -plane, about which the moment of inertia of the rod is same as that about  $Q$ , is

- (A) an ellipse (B) a circle  
 (C) a parabola (D) a straight line



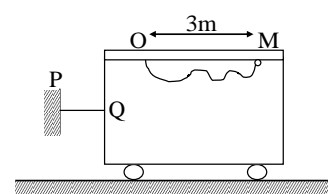
12. A mass  $m$  is attached to a rigid rod of negligible mass as shown in figure. The system is pivoted at point  $O$  and rotates about the indicated  $z$ -axis with angular velocity  $\vec{\omega}$  maintaining a fixed angle  $\theta$  with the axis.

- (A) Angular momentum  $\vec{L}$  of mass  $m$  about pivot is parallel to vector  $\vec{\omega}$   
 (B) Angular momentum  $\vec{L}$  of mass  $m$  about pivot is never parallel to  $\vec{\omega}$   
 (C)  $\vec{L}_O = -mr^2\omega \sin\theta \cos\theta \hat{i} + mr^2\omega \sin^2\theta \hat{k}$   
 (D) Angular momentum of particle about  $P$  is parallel to vector  $\vec{\omega}$

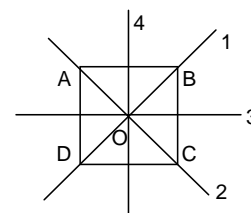


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13. A particle of mass 1 kg is attached to a string of length 5 m. The string is attached to a fixed point O. It is released from the position as shown in figure. Calculate



- (A) the impulse developed in the string when it becomes taut  $\frac{16}{\sqrt{5}}$  N-s  
 (B) the velocity of the particle just after the string becomes taut  $\frac{12}{\sqrt{5}}$  m/s  
 (C) the impulse developed in this string PQ at this instant  $\frac{48}{5\sqrt{5}}$  N-s  
 (D) tension in the string immediately = 12 N
14. The moment of inertia of a thin square plate ABCD of uniform thickness about an axis passing through the centre O and perpendicular to plate is  
 (A)  $I_1 + I_2$  (B)  $I_2 + I_3$   
 (C)  $I_1 + I_3$  (D)  $I_3 + I_4$



15. If a circular concentric hole is made in a disc then about an axis passing through the centre of the disc and perpendicular to its plane  
 (A) moment of inertia decreases (B) moment of inertia increases  
 (C) radius of gyration increases (D) radius of gyration decreases
16. A wire of length  $\ell$  is bent into the shape of an "n" sided regular polygon mass be 'm', then its  
 (A) the M.I. about its centre (axis perpendicular to the plane) is  $\frac{m\ell^2}{4n^3} \left( \frac{1}{3} + \cot^2 \left( \frac{\pi}{n} \right) \right)$   
 (B) the M.I. about its centre (axis perpendicular to the plane) is  $\frac{m\ell^2}{4n^2} \left( \frac{1}{3} + \cot^2 \left( \frac{\pi}{n} \right) \right)$   
 (C) the M.I. in the limiting case is an if  $n \rightarrow \infty$  then M.I. is  $\frac{m\ell^2}{4\pi^2}$   
 (D) the M.I. in the limiting case is an if  $n \rightarrow \infty$  then M.I. is  $\frac{m\ell^2}{8\pi^2}$

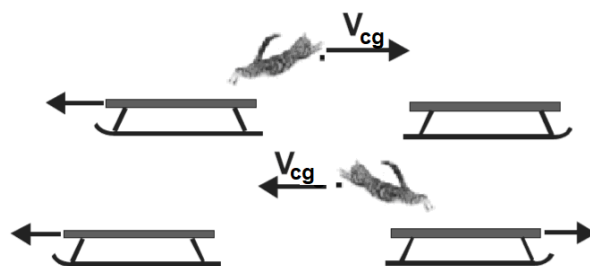
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## SECTION 3 (Maximum Marks: 16)

- ◆ This section contains **TWO** paragraphs
- ◆ Based on each paragraph, there will be **TWO** questions
- ◆ Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- ◆ **Marking scheme:**
  - +4** If only the bubble(s) corresponding to all the correct option(s) is(are) darkened
  - 0** If none of the bubbles is darkened
  - 2** In all other cases

## Paragraph-1

A strange cat with a mass  $m_c$  is sitting at rest on the left sled of a pair of identical sleds. The sleds have mass  $m_s$  and sit on frictionless ice. Suddenly, the cat leaps to the right sled, traveling with a horizontal speed  $V_{cg}$  measured with respect to the ground. The instant the cat reaches the right sled, it turns around and leaps back to the left sled. The horizontal component of the cat's speed is again  $V_{cg}$  measured with respect to the ground.

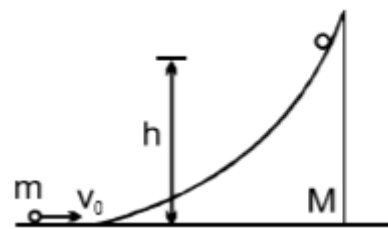


17. What is the final speed of the right sled ?
- (A)  $\frac{2m_c V_{cg}}{m_s}$                       (B)  $\frac{m_c V_{cg}}{m_s}$                       (C)  $\frac{2(m_c + m_s) V_{cg}}{m_s}$                       (D) zero
18. What is the final speed of Left sled in terms of the masses of the cat and sleds and the cat's leaping speed ? (The cat remains on the left sled after its return)
- (A)  $\frac{2m_c V_{cg}}{m_s + m_c}$                       (B)  $\frac{2m_s V_{cg}}{m_s + m_c}$                       (C)  $\frac{2m_c V_{cg}}{m_s}$                       (D)  $\frac{m_c V_{cg}}{m_s}$

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**Paragraph-2**

A particle of mass  $m$  moving horizontal with  $v_0$  strikes a smooth wedge of mass  $M$ , as shown in figure. After collision, the ball starts moving up the inclined face of the wedge and rises to a maximum height  $h$  on it. After that it starts sliding down the inclined. Now Answer the questions  
Take all the surfaces smooth



19. The maximum height  $h$  attained by the particle is  
 (A)  $\left(\frac{m}{m+M}\right)\frac{v_0^2}{2g}$       (B)  $\left(\frac{m}{M}\right)\frac{v_0^2}{2g}$       (C)  $\left(\frac{M}{m+M}\right)\frac{v_0^2}{2g}$       (D) None of these
20. Suppose  $m = M$  then what will be the maximum velocity attained by the inclined wedge during the entire motion ?  
 (A)  $\frac{v_0}{2}$       (B)  $v_0$       (C)  $\frac{v_0}{4}$       (D) None of these

**PART II: CHEMISTRY**  
**SECTION 1 (Maximum Marks: 32)**

- ◆ This section contains **EIGHT** questions
- ◆ The answer to each question is a **SINGLE DIGIT INTEGER** ranging from **0 to 9**, both inclusive
- ◆ For each question, darken the bubble corresponding to the correct integer in the ORS

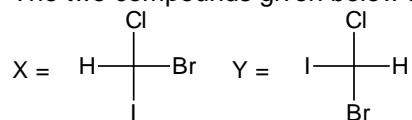
◆ **Marking scheme:**

- +4** If the bubble corresponding to the answer is darkened  
**0** In all other cases

21. The number of optical isomers for the compound  $\text{CH}_3\text{-CH(Br)-CH(Br)C}_2\text{H}_5$  is

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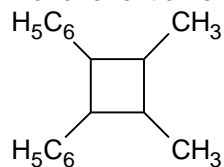
22. The two compounds given below are



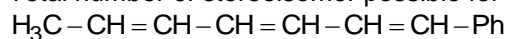
The no. correct statements are

- (i) They are homomers (ii) They are diastereomers (iii) enantiomers  
 (iv) both configurations is R (v) both configurations is S  
 (vi) X configuration is R & Y configuration is S  
 (vii) X Configuration is S & Y configuration is R

23. No. of enantiomeric pairs possible for



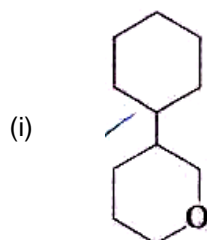
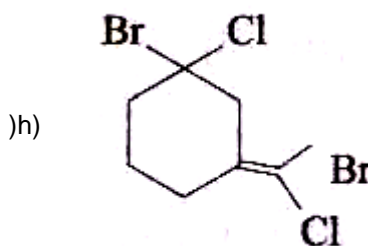
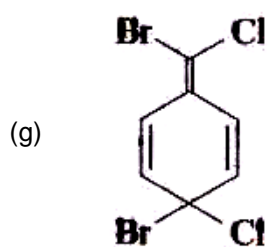
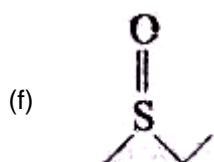
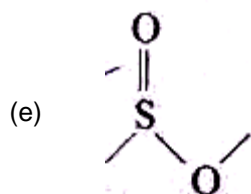
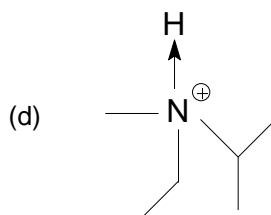
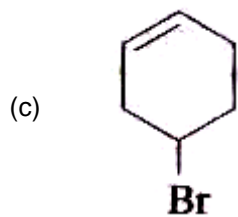
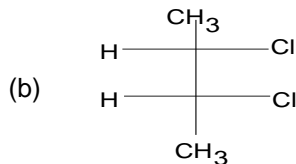
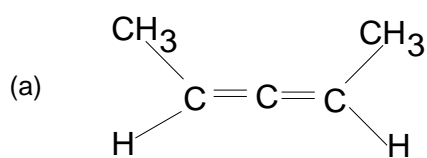
24. Total number of stereoisomer possible for the compound



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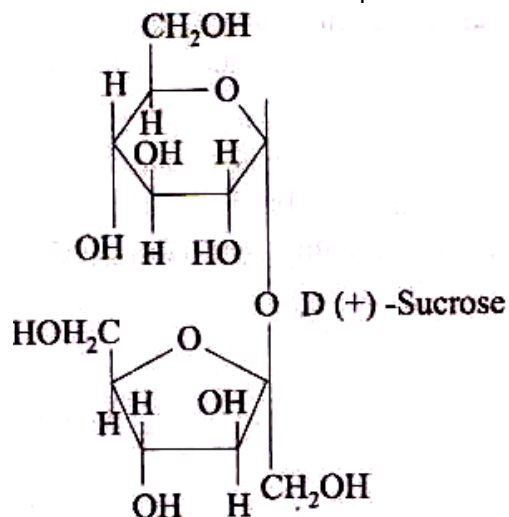


25. Examine the following structural formulae and select those that are chiral.



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26. The number of chiral centres present in the following compounds is

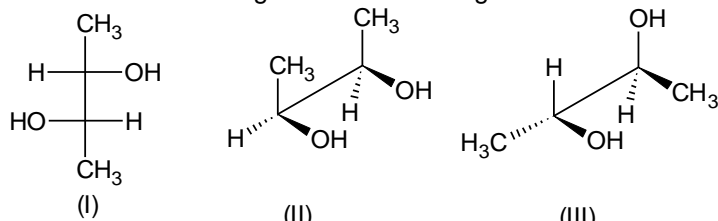


27. How many cyclic isomer(s) is/are possible with formula  $C_4H_6$  ?
28. The number of geometrical isomers possible for the compound  $CH_3-CH=CH-CH=CH-CH_3$  is

### SECTION 2 (Maximum Marks: 32)

- ◆ This section contains **EIGHT** questions
- ◆ Each question has FOUR options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- ◆ **Marking scheme:**
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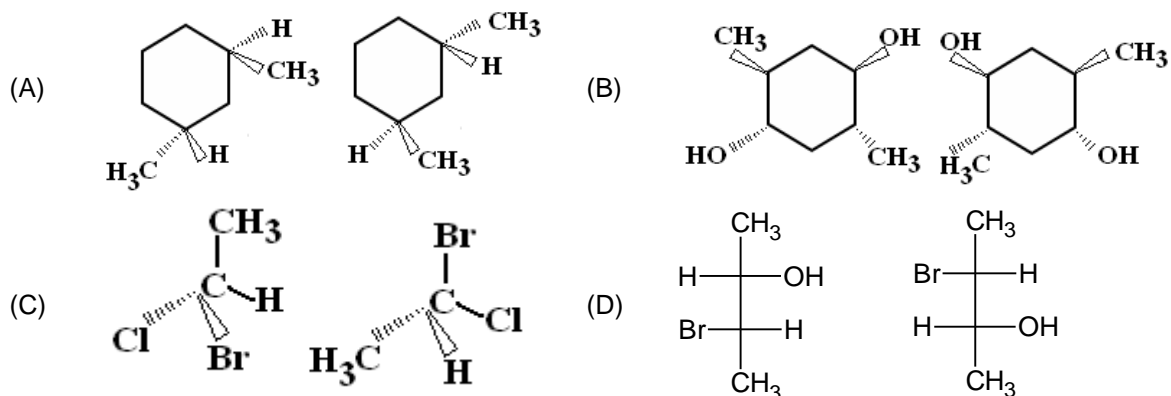
29. Which of the following is correct for the given structures ?



- (A) I and II are diastereomers                      (B) I and III are enantiomers  
 (C) II and III are diastereomers                      (D) II and III are identical

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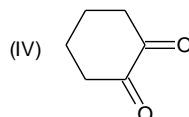
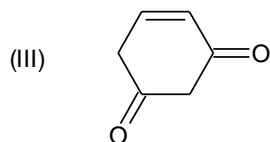
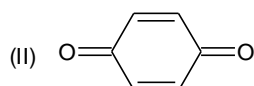
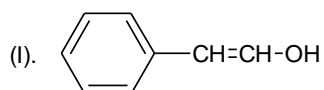
30. Which one of the following pairs of isomers are enantiomers



31. Maleic acid and fumaric acid are :

- (A) position isomer (B) geometrical isomer (C) enantiomers (D) Diastereomers

32. Tautomerism is exhibited by



(A) I, III and IV

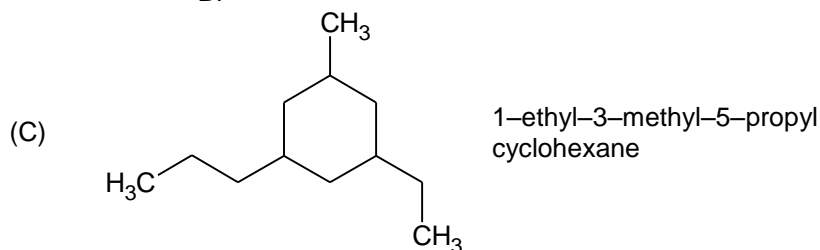
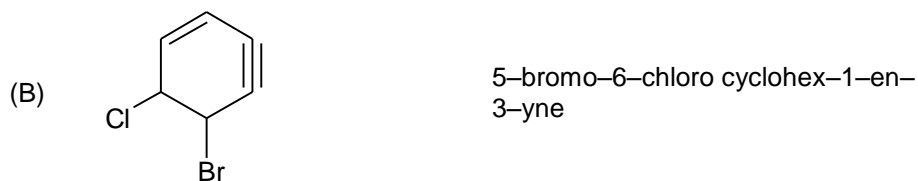
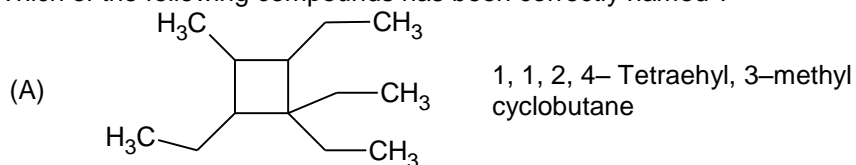
(B) II, III and IV

(C) All the four

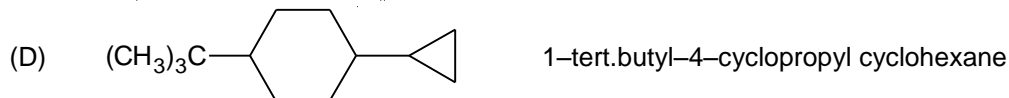
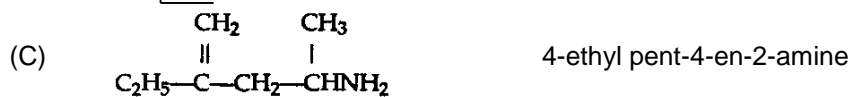
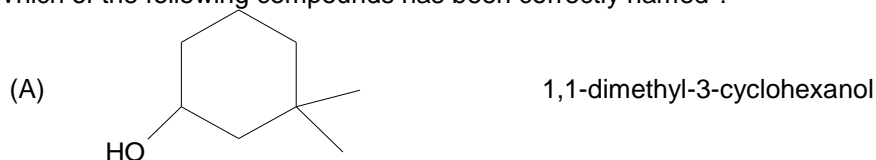
(D) none of these

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33. Which of the following compounds has been correctly named ?



34. Which of the following compounds has been correctly named ?

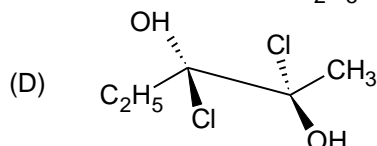
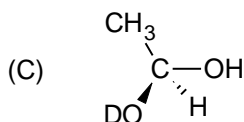
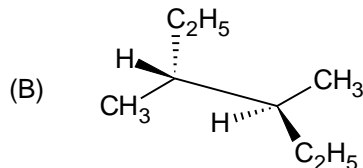
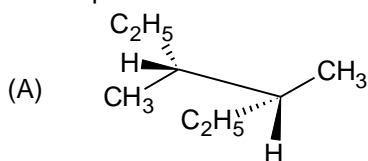


*Space for rough work*

35. The observed specific rotation for a enantiomerically pure sample of (+) 2-butanol is (+)  $13.5^\circ$ , the observed specific rotation for a mixture of 2-Butanol enantiomers is (+)  $6.75^\circ$ . What is the actual stereoisomeric composition of the mixture

- (A) 34%(+), 66%(-) (B) 75%(-), 25%(+)  
 (C) 75% (+), 25%(-) (D) 34%(-), 66%(+)

36. The compound which do show optical activity



### SECTION 3 (Maximum Marks: 16)

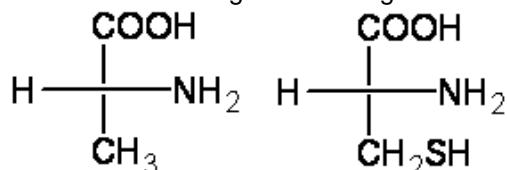
- ◆ This section contains **TWO** paragraphs
- ◆ Based on each paragraph, there will be **TWO** questions
- ◆ Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- ◆ **Marking scheme:**
  - +4** If only the bubble(s) corresponding to all the correct option(s) is(are) darkened
  - 0** If none of the bubbles is darkened
  - 2** In all other cases

*Space for rough work*

## Paragraph-1

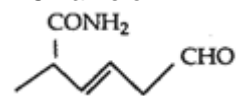
The IUPAC system is the most rational and widely used system of nomenclature organic chemistry. The most important feature of this system is that any given molecular structure has only one IUPAC name.

37. The absolute configuration assigned for compound (I) and (II) is correct



- (A) R, R                      (B) R, S                      (C) S, S                      (D) S, R

38. The IUPAC name of

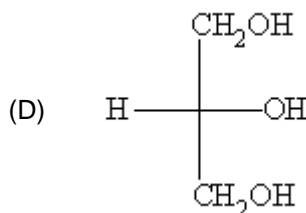
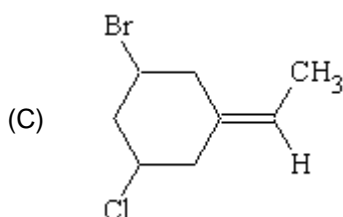
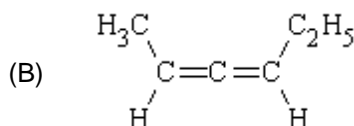
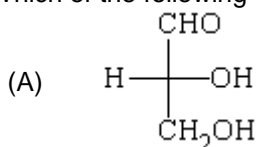


- (A) 2-carbamoyl hex-3-en-6-al                      (B) 5-carbamoyl hex-3-en-1-al  
(C) 6-keto-2-methylhex-3-enamide                      (D) 5-formyl-2-methylpent-3-en-1-amide

## Paragraph-2

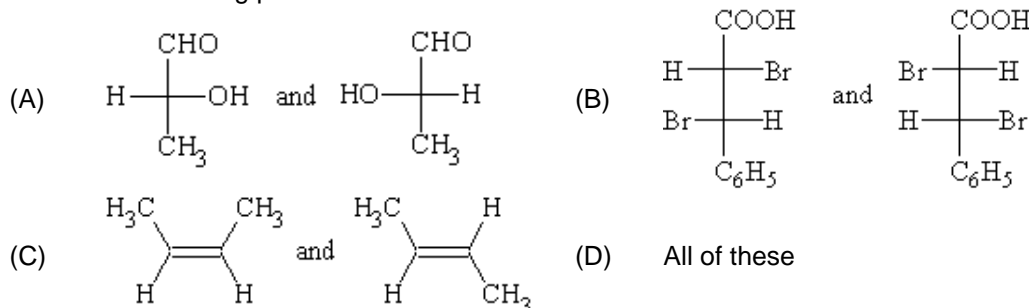
Isomers which are non super-imposable mirror images of each other are called enantiomers. All optically active compounds exhibit enantiomerism. The stereoisomers which are not mirror images of each other are called diastereomers. Enantiomers are always chiral molecules whereas diastereomers may or may not be chiral, configuration of the compound having no element of symmetry is always chiral. Chiral molecule may or may not contain chiral carbon

39. Which of the following compound is achiral



*Space for rough work*

40. Which of the following pairs are diastereomers?



### PART III: MATHEMATICS

#### SECTION 1 (Maximum Marks: 32)

- ◆ This section contains **EIGHT** questions
- ◆ The answer to each question is a **SINGLE DIGIT INTEGER** ranging from **0 to 9**, both inclusive
- ◆ For each question, darken the bubble corresponding to the correct integer in the ORS

◆ **Marking scheme:**

- +4** If the bubble corresponding to the answer is darkened  
**0** In all other cases

41. The number of isosceles  $\triangle ABC$  (s) possible such that  $\tan A + \tan B + \tan C = 100$  is
42. If A, B and C are the angles of a triangle, the minimum value of  $\tan^2 \frac{A}{2} + \tan^2 \frac{B}{2} + \tan^2 \frac{C}{2}$  is
43. Number of possible integral values of 'a' for which  $\cos 2x + a \sin x = 2a - 7$  has solutions.
44. If  $4n\alpha = \pi$ , then the value of  $\tan \alpha \tan 2\alpha \tan 3\alpha \dots \tan (2n - 1)\alpha$  is equal to
45. The area bounded by  $y \leq 3 - |3 - x|$  and  $y \geq |x - 3|$  is 'a', then the value of '2a' is
46. Let  $f(x) = \max \{x^2, (1 - x)^2, 2x(1 - x)\}$ , where  $0 \leq x \leq 1$ , If the area of the region bounded by the curves  $y = f(x)$ , x-axis,  $x = 0$  and  $x = 1$  is 'a', then the value of  $21 - 27a$  is
47. Area of the region enclosed between the curves  $x = y^2 - 1$  and  $x = |y|\sqrt{1 - y^2}$  is
48. Consider the functions  $f(x)$  and  $g(x)$ , both defined from  $\mathbb{R} \rightarrow \mathbb{R}$  and are defined as  $f(x) = 2x - x^2$  and  $g(x) = x^n$  where  $n \in \mathbb{N}$ . If the area between  $f(x)$  and  $g(x)$  is  $\frac{1}{2}$ , then the value of n is

**Space for rough work**

## SECTION 2 (Maximum Marks: 32)

- ◆ This section contains **EIGHT** questions
- ◆ Each question has FOUR options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct
- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
- ◆ **Marking scheme:**
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  - 0** If none of the bubbles is darkened
  - 2** In all other cases

49. The triangle formed by the normal to the curve  $f(x) = x^2 - ax + 2a$  at the point (2, 4) and the coordinate axes lies in second quadrant, if its area is 2 sq. units, then a can be
- (A) 2                                      (B)  $\frac{17}{4}$                                       (C) 5                                      (D)  $\frac{19}{4}$
50. If  $\left(\cos^2 x + \frac{1}{\cos^2 x}\right)(1 + \tan^2 2y)(3 + \sin 3z) = 4$ , then
- (A) x may be a multiple of  $\pi$                                       (B) x can not be an even multiple of  $\pi$   
 (C) z can be a multiple of  $\pi$                                       (D) y can be a multiple of  $\frac{\pi}{2}$
51. If  $\cos x + \cos y = a$ ,  $\cos 2x + \cos 2y = b$ ,  $\cos 3x + \cos 3y = c$ , then
- (A)  $\cos^2 x + \cos^2 y = 1 + \frac{b}{2}$                                       (B)  $\cos x \cos y = \frac{a^2}{2} - \left(\frac{b+2}{4}\right)$   
 (C)  $2a^3 + c = 3a(1 + b)$                                       (D)  $a + b + c = 3abc$
52. If a function  $y = f(x)$  satisfying the conditions  $f(x) + f(y) = f(x)f(y) + f(xy)$  where  $f(1) = 0$  and  $f'(1) = -2$  and the area bounded by  $y = f(x)$  and  $y = |\cos^{-1}(\cos x) - \sin^{-1}(\sin x)|$  from  $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$  is A, then
- (A) function  $y = f(x)$  is  $1 + x^2$                                       (B)  $A = \frac{4\sqrt{2}-3}{3}$  sq. units  
 (C) function  $y = f(x)$  is  $1 - x^2$                                       (D)  $A = \frac{6+2\sqrt{2}}{3}$  sq. units

**Space for rough work**



53. If  $A\left(\frac{3}{\sqrt{2}}, \sqrt{2}\right), B\left(\frac{-3}{\sqrt{2}}, \sqrt{2}\right), C\left(\frac{-3}{\sqrt{2}}, -\sqrt{2}\right)$  and  $D(3 \cos \theta, 2 \sin \theta)$  are four points, then value of  $\theta$  for which area of quadrilateral ABCD is maximum is, where  $\theta \in \left(\frac{3\pi}{2}, 2\pi\right)$
- (A) maximum area of 10 sq. units (B)  $\theta = \frac{7\pi}{4}$   
 (C)  $\theta = 2\pi - \sin^{-1}\left(\frac{3}{\sqrt{85}}\right)$  (D) maximum area is 12 sq. units
54. For which of the following values of  $m$ , is the area of the region bounded by the curve  $y = x - x^2$  and the line  $y = mx$  equals  $\frac{9}{2}$
- (A) -4 (B) -2 (C) 2 (D) 4
55. If  $x = \tan(A + B) + \tan(A - B)$ ,  $y = \tan(A + B) \tan(A - B)$  then
- (A)  $x = \frac{2 \sin 2A}{\cos 2A + \cos 2B}$  (B)  $x = \frac{\sin 2A}{\cos^2 A - \sin^2 B}$   
 (C)  $y = \frac{\cos 2B - \cos 2A}{\cos 2B + \cos 2A}$  (D)  $y = \frac{\cos 2A - \cos 2B}{\cos 2A + \cos 2B}$
56. If  $\frac{x}{y} = \frac{\cos A}{\cos B}$  where  $A \neq B$ , then
- (A)  $\tan \frac{A+B}{2} = \frac{x \tan A + y \tan B}{x+y}$  (B)  $\tan \frac{A-B}{2} = \frac{x \tan A - y \tan B}{x+y}$   
 (C)  $\frac{\sin(A+B)}{\sin(A-B)} = \frac{y \sin A + x \sin B}{y \sin A - x \sin B}$  (D)  $x \cos A + y \cos B = 0$

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**Space for rough work**

## SECTION 3 (Maximum Marks: 16)

- ◆ This section contains **TWO** paragraphs
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## Paragraph-1

If the boundary of a figure is represented by parametric equations i.e.,  $x = x(t)$ ,  $y = y(t)$ , then the area of the figure is evaluated by one of the three formulas

$$S = -\int_{\alpha}^{\beta} y(t) \cdot x'(t) dt \qquad S = \int_{\alpha}^{\beta} x(t) \cdot y'(t) dt$$

$S = \frac{1}{2} \int_{\alpha}^{\beta} (xy' - yx') dt$ , where  $\alpha$  and  $\beta$  are the values of the parameter 't' corresponding respectively to the beginning and the end of the traversal of the curve corresponding to increasing 't'.

57. The area enclosed by the curve  $\left(\frac{x}{a}\right)^{2/3} + \left(\frac{y}{a}\right)^{2/3} = 1$  is
- (A)  $\frac{3}{4}a^2\pi$                       (B)  $\frac{3}{18}\pi a^2$                       (C)  $\frac{3}{8}\pi a^2$                       (D)  $\frac{3}{4}a\pi$
58. The area of the region bounded by an arc of the cycloid  $x = a(t - \sin t)$ ,  $y = a(1 - \cos t)$  and the x-axis is
- (A)  $6\pi a^2$                       (B)  $3\pi a^2$                       (C)  $4\pi a^2$                       (D) none of these

**Space for rough work**

## Paragraph-2

$$x = \operatorname{cosec}^2\theta, y = \sec^2\theta, z = \frac{1}{1 - \sin^2\theta \cos^2\theta}$$

59.  $\frac{1}{x^2} + \frac{1}{y^2}$  is equal to

(A)  $\frac{2+z}{z}$

(B) 1

(C) z

(D)  $\frac{z}{2-z}$

60.  $\frac{\tan 3\theta}{\tan \theta}$  is equal to

(A)  $\frac{(3x-4)y}{(4-3y)x}$

(B)  $\frac{(4-3y)x}{(3x-4)y}$

(C)  $\frac{3x-y}{x-3y}$

(D) none of these

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**Space for rough work**

# FIITJEE RET – 9

EXTENDED\_2019

IIT-2015 (P2)

DATE: 08.10.2018

ANSWERS

## PHYSICS

1. 3	2. 3	3. 9	4. 2
5. Bonus	6. 7	7. 7	8. 3
9. C	10. D	11. Bonus	12. BC
13. ABC	14. ABCD	15. AC	16. BC
17. A	18. A	19. C	20. B

## CHEMISTRY

21. 4	22. 2	23. 4	24. 8
25. 8	26. 9	27. 5	28. 3
29. A	30. A, B, C, D	31. B, D	32. A
33. A, B, C	34. B, C, D	35. C	36. A, C, D
37. B	38. D	39. C or D	40. C

## MATHEMATICS

41. Bonus	42. 1	43. 5	44. 1
45. 9	46. 3 or 4	47. 2	48. 5
49. BC	50. AD	51. ABC	52. BC
53. BD	54. BD	55. ABC	56. ABC
57. C	58. B	59. Bonus	60. C