

FIITJEE RET – 3

EXTENDED_2019

IIT-2015 (P2)

DATE: 30.07.2018

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.:

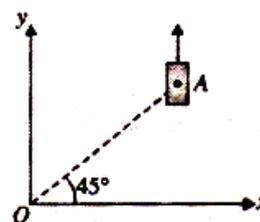
PAPER – II
PART I: PHYSICS
SECTION 1 (Maximum Marks: 32)

- ◆ 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

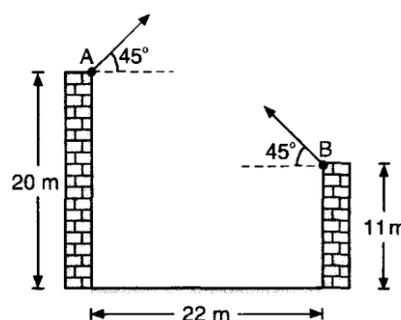
1. On a frictionless horizontal surface, assumed to be the x - y plane, a small trolley A is moving along a straight line parallel to the y -axis with a constant velocity of $(\sqrt{3}-1) \text{ ms}^{-1}$. At a particular instant, when the line OA makes an angle of $\theta = 45^\circ$ with the x -axis, a ball is thrown along the surface from the origin O. Its velocity makes an angle ϕ with the x -axis and it hits the trolley.



Find the speed of ball with respect to the surface, if $\phi = 4\theta/3$

2. A person walks up a stationary 15m long escalator in 90s. When standing on the same escalator, now moving the person is carried up in 60s. The time in seconds, would it takes for the person to walk up the moving escalator is $6x$, where x is
3. A sailor in a boat, which is going due east with a speed of 8 ms^{-1} observes that a submarine is heading towards north at a speed of 12 ms^{-1} and sinking at a rate of 2 ms^{-1} . The commander of submarine observes a helicopter ascending at a rate of 5 ms^{-1} and heading towards west with 4 ms^{-1} . Find the speed of the helicopter with respect to boat, is $(10+P) \text{ ms}^{-1}$, where P is

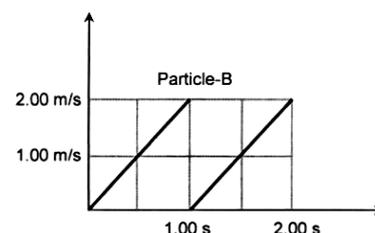
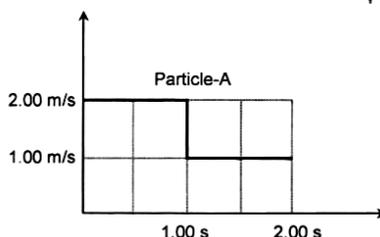
4. Two particles are simultaneously thrown from the roofs of two high buildings as shown in figure. Their velocities are $v_A = 2 \text{ ms}^{-1}$ and $v_B = 14 \text{ ms}^{-1}$ respectively. Calculate the minimum distance (in metre) between the particles in the process of their motion.



Space for rough work

5. Two particles P and Q move with constant velocities $v_1 = 2 \text{ ms}^{-1}$ and $v_2 = 4 \text{ ms}^{-1}$ along two mutually perpendicular straight lines towards the intersection point O. At moment $t=0$, the particles were located at distances $\ell_1 = 12\text{m}$ and $\ell_2 = 19\text{m}$ from O, respectively. Find the time when they are nearest (in seconds)
6. A train is moving along a straight line with a constant acceleration a . A boy standing in the train throws a ball forward with a speed of 10 ms^{-1} , at an angle of 60° to the horizontal. The boy has to move forward by 1.15m inside the train to catch the ball back to the initial height. The acceleration of the train, in ms^{-2} , is
7. Two particles are projected from a point at the same instant with velocities whose horizontal components and vertical components are (u_1, v_1) and (u_2, v_2) respectively such that there is another common point (other than origin) on their trajectories. The time interval between their passing through the other common point of their path (other than origin) is $\frac{1}{\alpha} \left(\frac{v_1 u_2 - v_2 u_1}{u_1 + u_2} \right)$. Here α is an integer. Find α . (Use $g = 10\text{m/s}^2$)

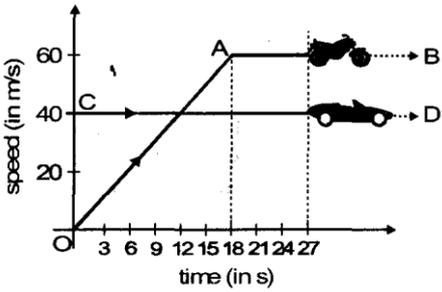
8. Two particles A and B starts from the same point and move in the positive x-direction. Their velocity – time relationships are shown in the following figures. If the maximum separation between them during the time interval shown is $\frac{n}{4}$, then n is



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:**
 - +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

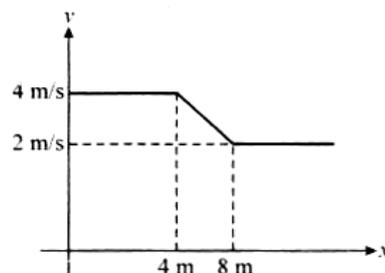
9. At the instant a motor bike starts from rest in a given direction, a car overtakes the motor bike, both moving in the same direction. The speed time graphs for motor bike and car are represented by OAB and CD respectively. Then
- 
- (A) at $t = 18\text{s}$ the motor bike and car are 180 m apart
- (B) at $t = 18\text{s}$ the motor bike and car are 720 m apart
- (C) the relative distance between motor bike and car reduces to zero at $t = 27\text{s}$ and both are 1080m far from origin
- (D) the relative distance between motor bike and car always remains same
10. Ship A is located 4km north and 3km east of ship B. Ship A has a velocity of 20 kmh^{-1} towards the south and ship B is moving at 40 kmh^{-1} in a direction 37° north of east. X and Y axes are along east and north directions, respectively
- (A) Velocity of A relative to B is $-32\hat{i} - 44\hat{j}$
- (B) Position of A relative to B as a function of time is given by $\vec{r}_{AB} = (3 - 32t)\hat{i} + (4 - 44t)\hat{j}$
- (C) Velocity of A relative to B is $32\hat{i} - 44\hat{j}$
- (D) Position of A relative to B as a function of time is given by $(32t\hat{i} - 44t\hat{j})$

Space for rough work

11. A man who can swim at a velocity v relative to water wants to cross a river of width b , flowing with a speed u .
- (A) The minimum time in which he can cross the river is b/v
- (B) He can reach a point exactly opposite on the bank in time $t = \frac{b}{\sqrt{v^2 - u^2}}$ if $v > u$
- (C) He cannot reach the point exactly opposite on the bank if $u > v$
- (D) He cannot reach the point exactly opposite on the bank if $v > u$
12. A stationary person observes that rain is falling vertically down at 30 kmh^{-1} . A cyclist is moving up on an inclined plane making an angle 30° with horizontal at 10 kmh^{-1} . In which direction should the cyclist hold his umbrella to prevent himself from the rain?
- (A) At an angle $\tan^{-1}\left(\frac{3\sqrt{3}}{5}\right)$ with inclined plane (B) At an angle $\tan^{-1}\left(\frac{3\sqrt{3}}{5}\right)$ with horizontal
- (C) At an angle $\tan^{-1}\left(\frac{\sqrt{3}}{7}\right)$ with inclined plane (D) At an angle $\tan^{-1}\left(\frac{\sqrt{3}}{7}\right)$ with vertical
13. An aeroplane flies along a straight line from A to B with a speed v_0 and back again with the same speed v_0 . A steady wind v is blowing. If $AB = \ell$ then
- (A) total time for the trip is $\frac{2v_0\ell}{v_0^2 - v^2}$, if wind blows along the line AB
- (B) total time for the trip is $\frac{2\ell}{\sqrt{v_0^2 - v^2}}$, if wind blows perpendicular to the line AB
- (C) total time for the trip decreases because of the presence of wind
- (D) total time for the trip increases because of the presence of wind

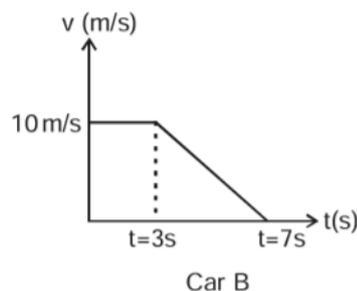
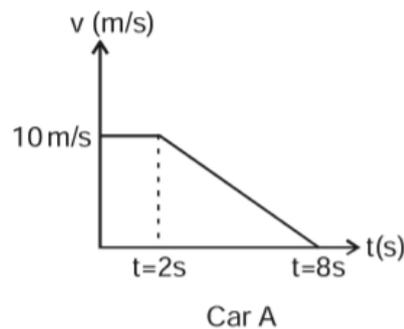
Space for rough work

14. The velocity of particle that moves in the positive X-direction varies with its position, as shown in fig, Then which of the following options is/ are correct.



- (A) At $x=6\text{m}$, the acceleration of the particle is -1.5 m/s^2
 (B) Time taken by the particle to travel from $x=0$ to $x=12\text{ m}$ is $(3 + \ln 2)$ seconds
 (C) Time taken by the particle to travel from $x=4\text{m}$ to $x=6\text{m}$ is $2\ln(4/3)$ seconds
 (D) At $t=(1 + \ln 2)$ second, the particle is at $x=6\text{ m}$ (Take $t=0$ when the particle is at origin)
15. The acceleration of a particle as observed from two different frames S_1 and S_2 have equal magnitudes of 2ms^{-2}
- (A) The relative acceleration of the frame may either be zero or 4ms^{-2}
 (B) Their relative acceleration may have any value between 0 and 4 ms^{-2}
 (C) Both the frames may be stationary with respect to earth
 (D) The frames may be moving with same acceleration in same direction

16. Car A and car B move on a straight road and their velocity versus time graphs are as shown in figure. Comparing the motion of car A in between $t = 0$ to $t = 8$ sec and motion of car B in between $t = 0$ to $t = 7$ sec., pick up the correct statement.



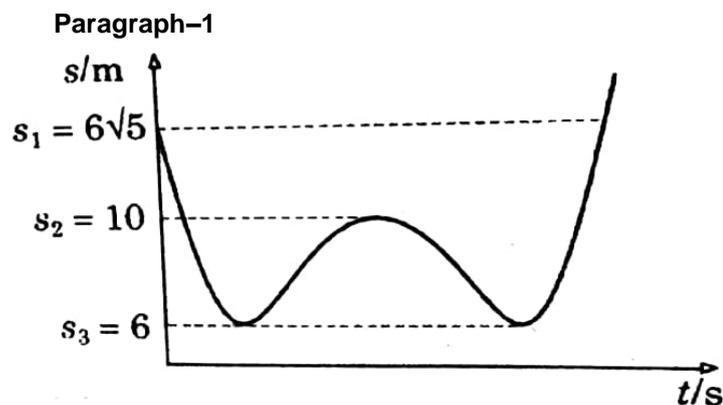
- (A) Distance traveled by car A is less than distance traveled by car B.
 (B) Distance traveled by car A is greater than distance traveled by car B.
 (C) Average speed of both cars are equal
 (D) Average speed of car A is less than average speed of car B.

Space for rough work

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
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Paragraph-1
A ball is thrown vertically upward. Its distance s (in meter) from a fixed point varies with time t (in sec) according to graph shown in fig.

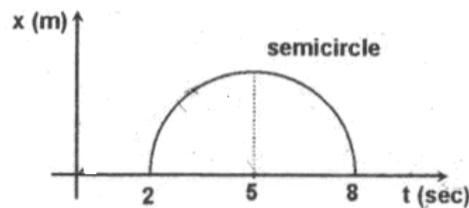


17. Then velocity of projection of the ball is _____ (Take $g = 10 \text{ m/s}^2$)
 (A) 15 m/s (B) 20 m/s (C) 10 m/s (D) None of these
18. The velocity of the ball at the instance $S = 10$ is
 (A) 0 m/s (B) 10 m/s (C) 15 m/s (D) 20 m/s

Space for rough work

Paragraph-2

Figure shows position versus time plot for a point moving along x-axis. Let t_0 be the time instant when the instantaneous velocity becomes same as the average velocity calculated in the duration 0 to t_0 .



19. Find t_0
 (A) 2 sec (B) $(16/5)$ sec (C) 5 sec (D) None
20. Velocity of point at t_0 is
 (A) 0 m/s (B) 0.6 m/s (C) 0.75 m/s (D) 0.8 m/s

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

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0 In all other cases

21. Find out the number of waves made by a Bohr's electron in one complete revolution in its 3rd orbit.
22. The work function (ϕ) of some metals is listed below. The number of metals which will show photoelectric effect when light of 300 nm wavelength falls on the metal is :
- | Metal | Li | Na | K | Mg | Cu | Ag | Fe | Pt | W |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| ϕ (eV) | 2.4 | 2.3 | 2.2 | 3.7 | 4.8 | 4.3 | 4.7 | 6.3 | 4.75 |
23. The wavelength ratio of two radiations is 1 : 5 the ratio of their energy is :

Space for rough work

24. The ratio of velocity of electrons in 1st orbit and 3rd orbit is
25. 80 mL of M/24 $K_2Cr_2O_7$ solution oxidizes 22.4 mL H_2O_2 solution. The volume strength of H_2O_2 solution is ...
26. What is the degeneracy of the level of the hydrogen atom that has the energy $\frac{-R_H}{9}$?
27. The number of visible lines when electron returns from the 5th orbit to ground state in the hydrogen spectrum
28. The de Broglie wave length of an electron in a certain Bohr's orbit of Hydrogen atom is 6.64 \AA . The quantum number of orbit 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
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29. Which of the following statement is correct.
- (A) In hydrogen atom, energy of first excited state is -3.4 eV . Then, KE of same orbit of hydrogen atom is $+ 3.4 \text{ eV}$.
- (B) The work function for a metal is 4 eV . To emit a photo electron of zero velocity from the surface of the metal, the wavelength of incident light should be 3100 \AA .
- (C) The first emission in the atomic spectrum of hydrogen in the Balmer series is at $\frac{9R_H}{400} \text{ cm}^{-1}$
- (D) In hydrogen atom, energy of first excited state is -3.4 eV . Then, KE of same orbit of hydrogen atom is $+ 6.8 \text{ eV}$.

Space for rough work

30. Incorrect statement is
 (A) if the time taken by electron for revolution in first orbit of Be^{+3} is T, then the time of revolution in the second orbit will be $4T$
 (B) the ratio of KE & I.E of an electron present in ground state of Li^{+2} ion is 1:2
 (C) in H-atom an electron jumps from sixth energy level to the first excited state. The number of lines corresponding to the Lyman series are 15
 (D) None of these
31. The angular momentum of electron can have the value (s) :
 (A) $0.5 \frac{h}{\pi}$ (B) $\frac{h}{\pi}$ (C) $\frac{h}{0.5\pi}$ (D) $2.5 \frac{h}{2\pi}$
32. Which of the following is/are true in case of an aqueous solution of 0.1 moles of potassium ferrocyanide $(\text{K}_4[\text{Fe}(\text{CN})_6])$
 $\rightarrow 4\text{K}^+ + [\text{Fe}(\text{CN})_6]^{4-}$
 (A) It contains $(N_A/10)$ ions (B) it contains $0.5 N_A$ ions
 (C) It contains 0.5 mole of K^+ ions (D) it contains 0.10 mole of $[\text{Fe}(\text{CN})_6]^{4-}$ ions
33. 500 ml of 0.2 M NaOH solution concentration changes to 0.4 M by
 (A) Removing 250 ml of H_2O (B) Removing 500 ml of H_2O
 (C) adding 8g of NaOH (D) adding 4g of NaOH
34. A light source of wavelength λ illuminates a metal and ejects photo-electrons with $(\text{K.E.})_{\text{max}} = 1\text{eV}$.
 Another light source of wavelength $\frac{\lambda}{2}$, ejects photo-electrons from same metal with $(\text{K.E.})_{\text{max}} = 4\text{eV}$
 Find the value of work function in eV?
 (A) 2 (B) 4 (C) 6 (D) 8

Space for rough work

35. $\text{H}_2\text{O}_2 + \text{MnO}_4^- \rightarrow \text{Mn}^{2+} + \text{O}_2 + \text{H}_2\text{O}$
 (A) E.Wt of $\text{MnO}_4^- = \frac{M}{6}$ (B) $E_{\text{H}_2\text{O}_2} = \frac{M}{4}$ (C) $E_{\text{H}_2\text{O}_2} = \frac{M}{2}$ (D) $E_{\text{MnO}_4^-} = \frac{M}{5}$
36. $\text{H}_2\text{C}_2\text{O}_4$ and KHC_2O_4 be have both as acids and reductants. Amongst the following the true statements is/are -----
 (A) Equal volumes of 1M solutions of each is oxidized by equal volumes of 1 M KMnO_4
 (B) Their equivalent masses are equal to respective Molecular masses when behaving as reducing agents
 (C) 'V' ml of 1 M solution of each is neutralized by equal volumes of 1 M NaOH
 (D) 'V' ml of 1 N solution of each (as an acid) is neutralized by equal volumes of 1 M Ca(OH)_2

SECTION 3 (Maximum Marks: 16)

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Paragraph-1

A sample of H-atoms contains all atoms in ground state. If the atoms are irradiated by photons of $x \text{ \AA}$, the atoms get excited to a particular energy level. When these atoms de-excites, they emit the radiations of six different photon energies.

37. What is the value of 'x'?
 (A) 978.6 (B) 0.098 (C) 1032 (D) 1223
38. What is the orbit number for the excited state?
 (A) 6 (B) 3 (C) 4 (D) 2

Space for rough work

Paragraph-2

A German physicist gave a principle about the uncertainties in simultaneous measurement of position and momentum of small particles. According to that physicist, it is impossible to measure simultaneously the position and momentum of a small particle with absolute accuracy or certainty.

39. If uncertainty in position is twice the uncertainty in momentum, then uncertainty in velocity is
 (A) $\sqrt{\frac{h}{\pi}}$ (B) $\frac{1}{2m} \sqrt{\frac{h}{\pi}}$ (C) $\frac{1}{2m} \sqrt{h}$ (D) $\frac{1}{2\sqrt{2}m} \sqrt{\frac{h}{\pi}}$
40. The uncertainty in position of an electron ($m = 9.1 \times 10^{-28} \text{ gm}$) moving with a velocity $3 \times 10^4 \text{ cm/s}$ accurate up to 0.001% will be
 (A) 3.84 cm (B) 1.92 cm (C) 7.68 cm (D) 5.76 cm

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
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41. Integral value of λ for which the points $(\lambda + 1, 1)$, $(2\lambda + 1, 3)$, $(2\lambda + 2, 2\lambda)$ are collinear is
42. Number of integral values of m , for which the x-coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer, is
43. A man starts from the point $P(-3, 4)$ and reaches the point $Q(0, 1)$ touching the x-axis at $R(\alpha, 0)$ such that $PR + RQ$ is minimum. Then $5|\alpha| =$

Space for rough work

44. The number of integral values of x for which the function $\sqrt{\sin x + \cos x} + \sqrt{7x - x^2 - 6}$ is defined is
45. If $f(x) = \sqrt{4 - x^2} + \sqrt{x^2 - 1}$, then the maximum value of $(f(x))^2$ is
46. If $f(x) = \sin^2 x + \sin^2\left(x + \frac{\pi}{3}\right) + \cos x \cos\left(x + \frac{\pi}{3}\right)$ and $g\left(\frac{5}{4}\right) = 1$, then $(g \circ f)(x)$ is
47. The number of integral values of x satisfying the inequality $\left(\frac{3}{4}\right)^{6x+10-x^2} < \frac{27}{64}$ is
48. Suppose that $f(x)$ is a function of the form $f(x) = \frac{ax^8 + bx^6 + cx^4 + dx^2 + 15x + 1}{x}$, ($x \neq 0$). If $f(5) = 2$, then the value of $\frac{|f(-5)|}{4}$ is

SECTION 2 (Maximum Marks: 32)

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- ◆ For each question, darken the bubble(s) corresponding to all the correct option(s) in the ORS
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49. ABC is an isosceles triangle. If the coordinates of the base are B(1, 3) and C(-2, 7), the coordinates of vertex A can be
- (A) $\left(6, \frac{5}{6}\right)$ (B) $\left(\frac{5}{6}, 6\right)$ (C) $\left(-7, \frac{1}{8}\right)$
- (D) any point on the line $6x + 8y + 43 = 0$

Space for rough work

50. Angles made with the x-axis by two lines drawn through the point (1, 2) cutting the line $x + y = 4$ at a distance $\frac{\sqrt{6}}{3}$ from the point (1, 2) are
 (A) $\frac{\pi}{12}$ and $\frac{5\pi}{12}$ (B) $\frac{\pi}{8}$ and $\frac{3\pi}{8}$ (C) $-\frac{7\pi}{12}$ and $-\frac{11\pi}{12}$ (D) none of these
51. The straight line L is perpendicular to the line $5x - y = 1$. The area of the triangle formed by the line L and the coordinate axes is 5, then the equation of the line is
 (A) $x - 5y = 5\sqrt{2}$ (B) $x + 5y = 5\sqrt{2}$ (C) $x + 5y = -5\sqrt{2}$ (D) none of these
52. The possible value of 'x' for the function $f(x) = \sqrt[4]{(\log_{0.2} x)^3 + (\log_{0.2} x^3)(\log_{0.2} 0.0016x) + 36}$ is/are
 (A) $[0, 2\sqrt{3}]$ (B) $[2\sqrt{3}, 125]$ (C) $(0, 2\sqrt{3})$ (D) $(2\sqrt{3}, 125]$
53. Which of the following is even
 (A) $f(x) = \ln(\sqrt{1+x^2} + x)$ (B) $f(x) = \log\left(\frac{1-\sin x}{1+\sin x}\right)$
 (C) $f(x) = \int_0^x \log\left(\frac{1-\sin t}{1+\sin t}\right) dt$ (D) $f(x) = \log|x|$
54. If $f(x) = \cos [\pi^2]x + \cos [-\pi^2]x$, (where [.] denotes greatest integer function) then
 (A) $f\left(\frac{\pi}{2}\right) = -1$ (B) $f(\pi) = 1$ (C) $f(-\pi) = 0$ (D) $f\left(\frac{\pi}{4}\right) = 2$
55. Let $f(x) = \frac{\sqrt{\sin x}}{1 + \sqrt[3]{\sin x}}$, then domain f contains
 (A) $(0, \pi)$ (B) $(-2\pi, -\pi)$ (C) $(2\pi, 3\pi)$ (D) $(4\pi, 6\pi)$
56. The range of the function $f(x) = \cos [x]$ for $-\frac{\pi}{2} < x < \frac{\pi}{2}$ contains
 (A) $\{-1, 1, 0\}$ (B) $\{\cos 1, 1, \cos 2\}$ (C) $\{\cos 1, -\cos 1, 1\}$ (D) $[-1, 1]$

Space for rough work

SECTION 3 (Maximum Marks: 16)

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- ◆ 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

Equation of the line having slope 'm' and y intercept 'c' is $y = mx + c$. Equation of the line passing through (x_1, y_1) and having inclination ' θ ' with x-axis is $\frac{x - x_1}{\cos \theta} = \frac{y - y_1}{\sin \theta} = \pm r$ where $\theta \neq \frac{n\pi}{2}$ and 'r' is the distance of (x_1, y_1) from (x, y) along the line.

57. In a ΔABC , co-ordinates of A are $(1, 2)$ and the equations of the medians through B and C are $x + y = 5$ and $x = 4$ respectively then $AB^2 - AC^2$ is
 (A) 25 (B) 37 (C) 12 (D) 21
58. $A(1,1); B(4, -2); C(5,5)$ are vertices of a triangle ABC then the equation of the perpendicular dropped from C to internal angular bisector of A is
 (A) $x + y = 1$ (B) $y - 7 = 0$ (C) $x - 5 = 0$ (D) $2x + y = 0$

Paragraph-2

Let $f(x) = \begin{cases} 2x + a, & x \geq -1 \\ bx^2 + 3, & x < -1 \end{cases}$ and $g(x) = \begin{cases} x + 4, & 0 \leq x \leq 4 \\ -3x - 2, & -2 < x < 0 \end{cases}$

59. $g(f(x))$ is not defined if
 (A) $a \in (10, \infty), b \in (5, \infty)$ (B) $a \in (4, 10), b \in (5, \infty)$
 (C) $a \in (10, \infty), b \in (0, 1)$ (D) $a \in (4, 10), b \in (1, 5)$
60. If $a = 2$ and $b = 3$, then the range of $g(f(x))$ is
 (A) $(-2, 8]$ (B) $(0, 8]$ (C) $[4, 8]$ (D) $[-1, 8]$

Space for rough work

FIITJEE RET – 3

EXTENDED_2019

IIT-2015 (P1)

DATE: 30.07.2018

ANSWERS

PHYSICS

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

CHEMISTRY

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

MATHEMATICS

41.	2	42.	2	43.	3	44.	3
45.	6	46.	1	47.	7	48.	7
49.	BC	50.	AC	51.	BC	52.	BCD
53.	CD	54.	AC	55.	ABC	56.	B
57.	C (Bonus)	58.	C	59.	A	60.	C