

FIITJEE RET – 5

EXTENDED_2019

IIT-2014 (P1)

DATE: 27.08.2018

Time: 3 hours

Maximum Marks: 180

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 **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE** are correct.
9. **Section II** contains **10 questions**. The answer to each question is a **single digit integer**, ranging from 0 to 9 (both inclusive).

D. Marking Scheme

10. For each question in **Section I**, you will be awarded **3 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.
11. For each question in **Section II**, you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY**. In all other cases **zero (0) marks** will be awarded. **No negative 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:

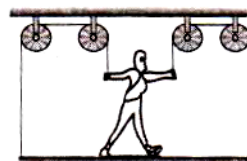
ENROLLMENT NO.:

PAPER-I
PART I: PHYSICS

SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

1. A painter of mass M stands on a platform of mass m and pulls himself up by two ropes which hang over pulley as shown in fig. He pulls each rope with force F and moves upward with a uniform acceleration a . Then



(A) Normal reaction between painter and the platform is $\frac{2F(M-m)}{(M+m)}$

(B) Normal reaction between painter and the platform is $\frac{2F(M-m)}{(2M+m)}$

(C) $a = \frac{4F - (M+m)g}{M+m}$

(D) $a = \frac{4F - (M+m)g}{2M+m}$

2. A homogeneous chain of length L lies on a table. The coefficient of friction between the chain and the table is μ . The maximum length which can hang over the table in equilibrium is (The vertical portion of table is smooth)

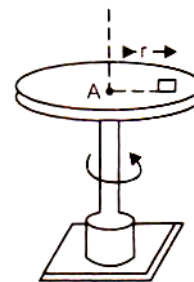
(A) $\left(\frac{\mu}{\mu+1}\right)L$

(B) $\left(\frac{1-\mu}{\mu}\right)L$

(C) $\left(\frac{1-\mu}{1+\mu}\right)L$

(D) $\left(\frac{2\mu}{2\mu+1}\right)L$

3. A small block B is supported by a turn – table. The friction coefficient between block and surface is μ . If turn –table rotates at constant angular speed ω , what can the maximum angular speed ω be for which the block does not slip? ($\mu = \frac{1}{2}, r = 10m$)



(A) $\frac{1}{\sqrt{2}}$ rad/sec

(B) $\frac{1}{\sqrt{3}}$ rad/sec

(C) $\frac{1}{\sqrt{5}}$ rad/sec

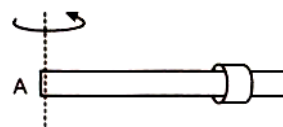
(D) None

Space for rough work

4. A car is moving in a circular path of radius 50 m, on a flat rough horizontal ground. The mass of the car is 1000 kg. At a certain moment, when the speed of the car is 5 m/s, the driver is increasing speed at the rate of 1m/s^2 . Find the value of static friction on tyres at this moment, in Newtons.

(A) $300\sqrt{5}\text{N}$ (B) $500\sqrt{5}\text{N}$ (C) $600\sqrt{5}\text{N}$ (D) 100 N

5. The figure shows a rod which starts rotating with angular acceleration α about vertical axis passing through one of its end (A) in horizontal plane. A bead of mass m just fits the rod and is situated at a distance 'r' from end A. Friction exists between rod and the bead with coefficient μ .



If the bead start sliding at $t = t_0$ then value of t_0 is given by

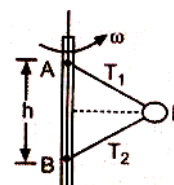
(A) $\sqrt{\frac{\mu\sqrt{g^2 + (r\alpha)^2}}{r\alpha^2}}$ (B) $\sqrt{\frac{mg}{r\alpha^2}}$
 (C) $\sqrt{\frac{\mu\sqrt{g^2 + (r\alpha)^2}}{r\alpha^2}} - \sqrt{\frac{mg}{r\alpha^2}}$ (D) None of these

6. A car is moving with speed v and is taking a turn on a circular road of radius 10m. The angle of banking is 37° . The driver wants that car does not slip on the road. The coefficient of friction is 0.4 ($g = 10\text{m/sec}^2$)

The speed of car for which no frictional force is produced is

(A) 5 m/sec (B) $5\sqrt{3}\text{m/sec}$ (C) $3\sqrt{5}\text{m/sec}$ (D) 10 m/sec

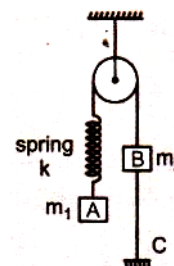
7. A particle P is attached by means of two equal strings two points A and B in same vertical line and describes horizontal circle with uniform angular speed $2\sqrt{\frac{2g}{h}}$ where $AB = h$



(A) $T_1 > T_2$ (B) $T_1 : T_2 = 5 : 3$ (C) $T_1 : T_2 = \sqrt{5} : \sqrt{3}$ (D) $T_1 = T_2$

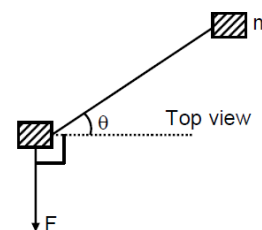
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8. In the system shown in the figure $m_1 > m_2$ system is held at rest by thread BC. Just after the thread BC is burnt



- (A) initial acceleration of m_2 will be upwards
 (B) magnitude of initial acceleration of both blocks will be equal to $\left(\frac{m_1 - m_2}{m_1 + m_2}\right)g$
 (C) initial acceleration of m_1 will be equal to zero
 (D) magnitude of initial acceleration of two blocks will be non-zero and unequal.
9. A worker wishes to pile a pyramid of sand with equilateral triangular base of side $3m$. If $\mu = \frac{1}{\sqrt{3}}$ is the co-efficient of static friction between each layer of sand along the slope of the sand, then maximum height of the pyramid will be (neglect any complexities at the corners) :
- (A) $\sqrt{3}m$ (B) $\frac{1}{2}m$ (C) $\frac{1}{3}m$ (D) $2\sqrt{3}m$

10. Figure shows top view of a horizontal surface. Two blocks each of mass m are placed on the surface and connected with a string. The friction coefficient is μ for each block. A horizontal force F is applied on one of the block as shown in the figure. F is maximum so that there is no sliding at any contact.



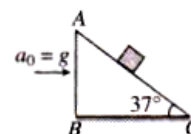
- (A) If $\theta = 30^\circ$ then $F = \frac{2\mu mg}{\sqrt{3}}$ & $T < \mu mg$ (B) If $\theta = 45^\circ$ then $F = \sqrt{2}\mu mg$ & $T = \mu mg$
 (C) If $\theta = 60^\circ$ then $F = 2\mu mg$ & $T < \mu mg$ (D) If $\theta = 60^\circ$ then $F = \sqrt{3}\mu mg$ & $T = \mu mg$

Space for rough work

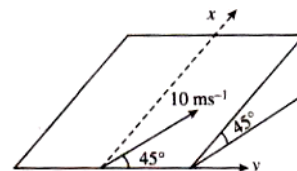
SECTION – II: (Integer value type)

This section contains **10 questions**. The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

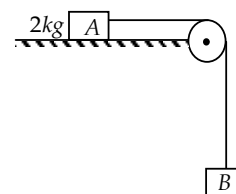
11. A block is placed on an inclined plane moving towards right horizontally with an acceleration $a_0 = g$. The length of the plane $AC = 1\text{m}$. Friction is absent everywhere. Find the time taken (in seconds) by the block to reach from C to A.



12. The small marble is projected with a velocity of 10 ms^{-1} in a direction 45° from the horizontal y -direction on the smooth inclined plane. If the magnitude of its velocity after 2s is $\alpha\text{ m/s}$ then $(\alpha - 3)$ is _____

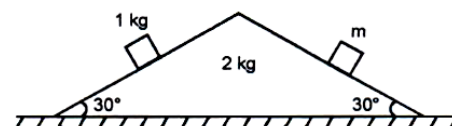


13. The coefficient of static friction, μ_s between block A of mass 2 kg and the table as shown in figure is 0.2. If 'M' (in kg) is maximum mass of the block B so that the two blocks do not move. Find the value of $10M$ (the string and the pulley are assumed to be smooth and massless $g = 10\text{m/s}^2$)



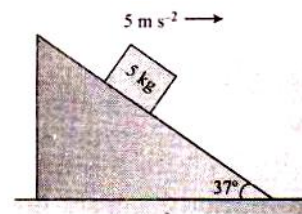
14. Two blocks of masses 3kg and 2kg are placed beside each other in contact with each other on a rough horizontal surface. A horizontal force of 20N is applied on 3kg. The coefficient of friction between blocks and the surface is 0.1 and $g = 10\text{ms}^{-2}$. The force of contact (in newton) between the two blocks is _____

15. In the given figure all surfaces are smooth. The system is released from rest. Find the value of m in kg for which 1 kg block does not slide on wedge.

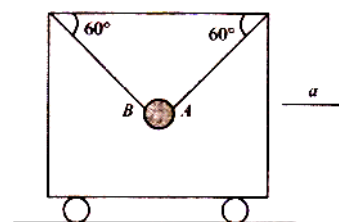


Space for rough work

16. An inclined plane is moved toward right with an acceleration of 5 ms^{-2} as shown in fig. If F_0 is the force in newton which block of mass 5 kg exerts on the incline plane. (All surface are smooth) then $\left(\frac{F_0}{5} - 2\right)$ is _____

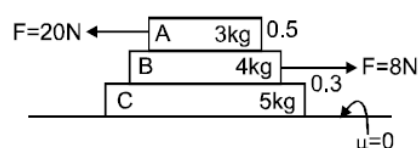


17. A steel ball is suspended from the ceiling of an accelerating carriage by means of two cords A and B. If 'a' (in m/s^2) is the acceleration of the carriage which will cause the tension in A to be twice that in B. Then find $\left(\sqrt{3}a - \frac{4}{3}\right)$.

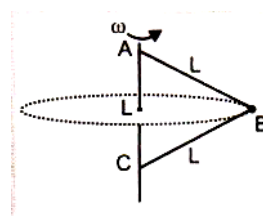


Take $g = 10 \text{ m/s}^2$ and shown fig depicts the equilibrium condition of the ball from carriage frame

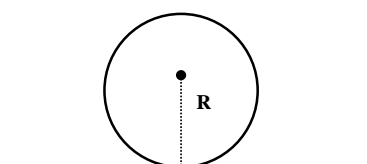
18. In the situation shown, coefficient of friction between A and B is 0.5 and between B and C is 0.3. Friction acting between B and C is x Newton then $\frac{7x}{9}$ is :



19. Two light inextensible strings AB and BC each of length L are attached to a particle of mass m at B. The other ends A and C are fixed to two points in a vertical line such that A is distant L above C. The particle describes a horizontal circle with constant angular velocity ω . The least value of ω so that both the strings are taut is $\sqrt{ng/L}$. Then $n =$



20. A cylinder of radius R is placed on the ground with its axis parallel to the ground. The minimum velocity with which particle must be projected from the ground so that it goes over the cylinder and reaches the other side is \sqrt{ngR} . Then $(n-2)^2$ is equal to.



Space for rough work

PART II: CHEMISTRY

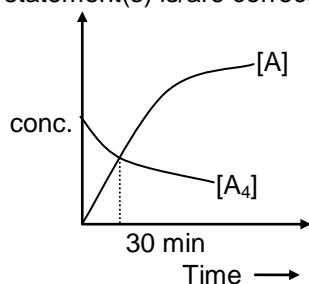
SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

21. For a reaction $A+2B \longrightarrow C+D$, the following data, were obtained
- | Expt. | initial conc.
(mol. L ⁻¹)
[A] | initial conc.
(mol L ⁻¹)
[B] | initial rate of
formation of D
(mol L ⁻¹ min ⁻¹) |
|-------|---|--|---|
| 1) | 0.1 | 0.1 | 6.0×10^{-3} |
| 2) | 0.3 | 0.2 | 7.2×10^{-2} |
| 3) | 0.3 | 0.4 | 2.88×10^{-1} |
| 4) | 0.4 | 0.1 | 2.4×10^{-2} |
- The correct rate law expression will be
 (A) Rate = $K[A][B]$ (B) Rate = $K[A][B]^2$ (C) Rate = $K[A]^2[B]^2$ (D) Rate = $K[A]^2[B]$
22. A plot of $\ln [A]_t$ vs t (where, $[A]_t$ is the concentration of the reactant at time t) for a reaction is linear with a negative slope of 0.0231 sec^{-1} . Then
 (a) The initial concentration of the reactant will reduce to half in 30 seconds.
 (b) A plot of $t_{1/2}$ vs concentration of reactant will give a straight line passing through origin.
 (c) The reaction will be 90% complete in 100 seconds.
 (d) The line in $\ln[A]_t$ vs t plot will be steeper at higher temperature.
23. In the Arrhenius equation, $k = Ae^{-E_a/RT}$, the rate constant (k) becomes equal to the Arrhenius constant (A), when:
 (A) The temperature becomes infinite
 (B) the 100% reactants are converted to product
 (C) The fraction of molecules crossing over the energy barrier is unity
 (D) The temperature of the reaction mixture is very low

Space for rough work

24. Consider the following first order decomposition reaction: $A_4(g) \rightarrow 4A(g)$. Which of the following statement(s) is/are correct regarding the reaction? (Take $\ln 2 = 0.69$ & $\ln 1.25 = 0.23$)



- (A) At 30 min. only 20% reaction is complete. (B) $t_{1/2}$ of reaction is approximately 90 min.
 (C) Rate of reaction decreases linearly with time.
 (D) The time for intersection of two curves is independent of initial concentration of A_4 .
25. Select the correct statement(s):
 (A) When $T \rightarrow \infty$ or $E_a \rightarrow 0$ then $k = A$
 (B) A positive catalyst can change ΔH of the reaction
 (C) A zero order reaction is completed in $2t_{1/2}$
 (D) $t_{1/2}$ of first order reaction is independent of initial concentration of reactant
26. Which of the following is/are correct ?
 (A) α -rays are more penetrating than β -rays
 (B) α -rays have greater ionizing power than β -rays
 (C) β -particles are not present in the nucleus yet they are emitted from the nucleus
 (D) γ -rays are more penetrating than α and β -rays
27. If the rate of reaction, $2SO_2(g) + O_2(g) \xrightarrow{Pt} 2SO_3(g)$ is given by :

$$\text{Rate} = K \frac{[SO_2]}{[SO_3]^{1/2}}$$

Which statements are correct

- (a) The overall order of reaction is $-1/2$
 (b) The overall order of reaction is $+1/2$
 (c) The reaction slows down as the product SO_3 is build up
 (d) The rate of reaction does not depend upon concentration of SO_3 formed

Space for rough work

28. Which of the following metals on treatment with NaOH will liberate H₂ gas ?
 (A) Zn (B) Sn (C) Al (D) Mg
29. The reagent(s) used for softening the temporary hardness of water is(are)
 (A) Ca₃(PO₄)₂ (B) Ca(OH)₂ (C) Na₂CO₃ (D) NaOCl
30. Hydrogen peroxide in its reaction with KIO₄ and NH₂OH respectively, is acting as
 (A) reducing agent, oxidizing agent (B) oxidizing agent, reducing agent
 (C) oxidizing agent, oxidizing agent (D) oxidizing agent, reducing agent.

SECTION – II: (Integer value type)

This section contains **10 questions**. The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

31. A reaction takes place in various steps. The rate constant for first, second, third and fifth steps are k_1 , k_2 , k_3 and k_5 respectively. The overall rate constant is given by $k = \frac{k_2}{k_3} \left(\frac{k_1}{k_5} \right)^{1/2}$. If activation energies of first, second, third and fifth steps are 40, 60, 50 and 10 kJ/mol respectively, the overall energy of activation (kJ/mol) is 5X then what is X value
32. If the rate of reaction is $2.6 \times 10^{-3} \text{ mol L}^{-1} \text{ S}^{-1}$ at 50°C and $7.02 \times 10^{-2} \text{ mol L}^{-1} \text{ S}^{-1}$, at 80°C then what will be the temperature coefficient of reaction.
33. A hydrogenation reaction is carried only at 500K. If the same reaction is carried out in presence of a catalyst at the same rate, the temperature required is 400K. If the catalyst lowers the activation barrier by 20 kJ mol^{-1} then the activation energy of the uncatalysed reaction is $E_a \text{ kJ mole}^{-1}$. Find $\frac{E_a}{20}$ value.
34. The first order decomposition of di-tert-butylperoxide (DTBP) to acetone is given by the equation:
 $\text{C}_8\text{H}_{18}\text{O}_2(\text{g}) \rightarrow 2\text{CH}_3\text{COCH}_3(\text{g}) + \text{C}_2\text{H}_6(\text{g})$
 The reaction has a half life of 80 min at 147°C. Starting with pure DTBP in a flask of constant volume at a pressure of 800 torr. At what time (in hour) the partial pressure of DTBP be 100 torr

Space for rough work

35. ${}^7_4\text{Be}$ captures a K electron in to its nucleus what will be the mass number of resulting nuclide.
36. In the nuclear reaction ${}^{235}_{92}\text{U} \rightarrow {}^{207}_{82}\text{Pb}$, the number of α and β particles lost would be x and y respectively then $x - y$ is _____
37. The rate constant (K) for the reaction, $2\text{A} + \text{B} \rightarrow \text{Product}$ was found to be $2.5 \times 10^{-5} \text{ litre mol}^{-1} \text{ sec}^{-1}$ after 15 sec, $2.60 \times 10^{-5} \text{ litre mol}^{-1} \text{ sec}^{-1}$ after 30 sec and $2.55 \times 10^{-5} \text{ litre mol}^{-1} \text{ sec}^{-1}$ after 50 sec. The order of reaction is
 (A) 2 (B) 3 (C) zero (D) can be anything
38. For the first order reaction, $\text{A}(\text{g}) \longrightarrow 2\text{B}(\text{g}) + \text{C}(\text{s})$; $t_{1/2} = 24 \text{ min}$. The reaction is carried out taking certain mass of A enclosed in a vessel in which it exerts a pressure of 400mm Hg. The pressure of the reaction mixture after the expiry of 48min will be $\text{P} \times 10^2 \text{ mm of Hg}$ then P is
39. A sample of rock from moon contains equal number of atoms of uranium and lead ($t_{1/2}$ for U = $4.5 \times 10^9 \text{ year}$). The age of the rock would be $\text{A} \times 10^9$. Then 2 A is .
40. In the upper atmosphere H_2O and O react bimolecularly to form two OH radicals. ΔH for this reaction is 72 kJ at 500 K and E_a is 77 kJ mol^{-1} , then E_a for the bimolecular recombination of two OH radicals to form H_2O and O is (in kJ/ mole)

PART III: MATHEMATICS

SECTION – I: (One or more than one options are correct)

This section contains **10 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE THAN ONE** are correct.

41. Consider a circle with its centre lying on the focus of the parabola $y^2 = 2px$ such that it touches the directrix of the parabola, then point of intersection of the circle and the parabola is/are
 (A) $\left(\frac{p}{2}, p\right)$ (B) $\left(\frac{p}{2}, -p\right)$ (C) $\left(\frac{-p}{2}, p\right)$ (D) $\left(\frac{-p}{2}, -p\right)$

Space for rough work

42. Equation: $x^2 - 2x - 2y + 5 = 0$, represents:
 (A) a circle with centre (1, 1) (B) a parabola with vertex (1, 2)
 (C) a parabola with directrix $y = \frac{5}{2}$ (D) a parabola with directrix $y = -\frac{1}{3}$
43. Tangent to the parabola $y = x^2 + ax + 1$ at a point where it intersects y-axis touches the circle $x^2 + y^2 = r^2$ for maximum value of 'a'. Also, no point of the parabola is below the x-axis
 (A) Radius of circle when 'a' attains its maximum value is $\sqrt{5}$
 (B) Radius of circle when 'a' attains its maximum value is $\frac{1}{\sqrt{3}}$
 (C) The slope of tangent when radius of circle is maximum, is 0
 (D) The slope of tangent when radius of circle is maximum, is -1
44. The equations of common tangents to the parabola $y = x^2$ and $y = -(x - 2)^2$ is/are
 (A) $y = 4(x - 1)$ (B) $y = 0$ (C) $y = -4(x - 1)$ (D) $y = -30x - 50$
45. The function $f(x) = \begin{cases} |2x - 3|[x]; & x \geq 1 \\ \sin\left(\frac{\pi x}{2}\right); & x < 1 \end{cases}$
 (where [.] denotes greatest integer function)
 (A) is differentiable at $x = 0$ (B) is continuous at $x = 0$
 (C) is continuous but not differentiable at $x = 1$ (D) is continuous but not differentiable at $x = \frac{3}{2}$
46. If $\lim_{x \rightarrow 0} (\cos x + a \sin bx)^{1/x} = e^2$, then the value of a and b are
 (A) $a = 1, b = 2$ (B) $a = 2, b = \frac{1}{2}$ (C) $a = 2\sqrt{2}, b = \frac{1}{\sqrt{2}}$ (D) $a = 4, b = 2$

Space for rough work

47. Let $f(x) = [x]$ and $g(x) = \begin{cases} 0, & x \in \mathbb{Z} \\ x^2, & x \in \mathbb{R} - \mathbb{Z} \end{cases}$ (where $[.]$ denotes greatest integer function), then
- (A) $\lim_{x \rightarrow 1} g(x)$ exists but $g(x)$ is not continuous at $x = 1$
 (B) $f(x)$ is not continuous at $x = 1$
 (C) $g(x)$ is continuous for all x
 (D) $f \circ g$ is continuous for all x
48. If $f(x) = \begin{cases} \frac{x \log \cos x}{\log(1+x^2)}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then
- (A) f is continuous at $x = 0$
 (B) f is continuous at $x = 0$ but not differentiable at $x = 0$
 (C) f is differentiable at $x = 0$
 (D) f is not continuous at $x = 0$
49. Which of the following is/are true for $f(x) = \operatorname{sgn}(x) \times \sin x$?
- (A) discontinuous no where
 (B) an even function
 (C) $f(x)$ is periodic
 (D) $f(x)$ is differentiable for all x
50. The function $f(x) = \begin{cases} 5x - 4, & \text{for } 0 < x \leq 1 \\ 4x^2 - 3x, & \text{for } 1 < x < 2 \\ 3x + 4, & \text{for } x \geq 2 \end{cases}$
- (A) continuous at $x = 1$ and $x = 2$
 (B) continuous at $x = 1$ but not derivable at $x = 2$
 (C) continuous at $x = 2$ but not derivable at $x = 1$
 (D) continuous at $x = 1$ and 2 but not derivable at $x = 1$

Space for rough work

SECTION – II: (Integer value type)

This section contains **10 questions**. The answer to each of the questions is a **single digit integer**, ranging from 0 to 9 (both inclusive).

51. If $f(x) = x \sin \frac{1}{x}$, $x \neq 0$, then the value of function at $x = 0$, so that the function is continuous at $x = 0$, is
52. The number of points at which the function $f(x) = \frac{1}{\log|x|}$ is discontinuous, is
53. Let $f\left(\frac{x+y}{2}\right) = \frac{f(x)+f(y)}{2}$ for all real values x and y . If $f'(0)$ exists and equals -1 and $f(0) = 1$, then $-f'(2)$ is
54. Let f be a function defined and continuous on $[2, 5]$. If $f(x)$ takes rational values for all x and $f(4) = 8$, then the value of $f(3.7)$ is
55. $\lim_{n \rightarrow \infty} \frac{2n!}{(2n+1)! - 2n!} = \frac{k}{2}$, then the value of 'k' is
56. If the value of $\lim_{n \rightarrow 0} \frac{\int_0^{x^2} \cos t^2 dt}{2x \sin x}$ is $\frac{k}{16}$, then the value of 'k' is
57. If $[x]$ denotes the greatest integer $\leq x$, then $\lim_{n \rightarrow \infty} \frac{1}{n^3} ([1^2x] + [2^2x] + \dots + [n^2x])$ equals $\frac{2x}{m}$, then the value of 'm' is
58. If the equation $(x-1)^2 + (y-2)^2 = \lambda(x+y-3)^2$ represents a parabola, then the value of $\frac{1}{\lambda}$ is
59. If a focal chord of $y^2 = 2x$ makes an angle $\alpha \in \left(0, \frac{\pi}{4}\right]$ with the positive direction of x-axis, then the minimum length of the focal chord is
60. Tangents PA and PB are drawn from a point P on the directrix of the parabola $(x-2)^2 + (y-3)^2 = \frac{(5x-12y+13)^2}{169}$. If L is the least radius of the circumcircle of the triangle PAB, then the value of $[L]$, (where $[.]$ denotes greatest integer function) is

Space for rough work

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EXTENDED_2019

IIT-2014 (P1)

DATE: 27.08.2018

ANSWERS

PHYSICS

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

CHEMISTRY

21.	B	22.	A, C,D	23.	A, B,C	24.	A, B, D
25.	A, C, D	26.	B, C, D	27.	B, C	28.	A, B, C
29.	B, C	30.	A	31.	5	32.	3
33.	5	34.	4	35.	7	36.	3
37.	2	38.	7	39.	9	40.	5

MATHEMATICS

41.	AB	42.	B	43.	C	44.	AB
45.	ABCD	46.	AC	47.	ABC	48.	AC
49.	AB	50.	AB	51.	0	52.	0
53.	1	54.	8	55.	0	56.	8
57.	6	58.	2	59.	4	60.	1