FIITJEE PET –IX (REG_2ND YEAR)

MAINS_SET–A

DATE: 22.09.2018

Time: 3 hours **Maximum Marks: 360**

INSTRUCTIONS:

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.

   Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.

2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.

3. Attempt all questions.

4. In case you have not darkened any bubble you will be awarded 0 mark for that question.

5. Use of calculator/logarithmic table is not permitted.

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.: ☐☐☐☐☐☐☐☐☐☐☐☐

1. $\int_{-1}^{1}\left\{\left(\frac{x+2}{x-2}\right)^2+\left(\frac{x-2}{x+2}\right)^2-2\right\}^{1/2}dx =$

(A) $8\log\frac{4}{3}$ (B) $8\log\frac{3}{4}$ (C) $4\log\frac{4}{3}$ (D) $4\log\frac{3}{4}$

2. $\int_{0}^{\pi/2}\frac{200\sin x+100\cos x}{\sin x+\cos x}dx =$

(A) 50π (B) 25π (C) 75π (D) 150π

3. Let $I = \int_{0}^{1}\frac{\sin x}{\sqrt{x}}dx$ and $J = \int_{0}^{1}\frac{\cos x}{\sqrt{x}}dx$. Then which of the following is true ?

(A) $I < \frac{2}{3}$ and $J < 2$ (B) $I < \frac{2}{3}$ and $J > 2$ (C) $I > \frac{2}{3}$ and $J < 2$ (D) $I > \frac{2}{3}$ and $J > 2$

4. The value of $\int_{0}^{1}\frac{8\log(1+x)}{1+x^2}dx$ is

(A) $\frac{\pi}{2}\log 2$ (B) $\log 2$ (C) $\pi \log 2$ (D) $\frac{\pi}{8}\log 2$

5. If $I = \int_{0}^{1}\cos\left(2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right)dx$, then

(A) $I > \frac{1}{2}$ (B) $I = -\frac{1}{2}$ (C) $I < \frac{1}{2}$ (D) $I = \frac{1}{2}$

6. If $f(x) = \frac{e^x}{1+e^x}$, $I_1 = \int_{f(-a)}^{f(a)} xg\{x(1-x)\}dx$ and $I_2 = \int_{f(-a)}^{f(a)} g\{x(1-x)\}dx$, then the value of $\frac{I_2}{I_1}$ is

(A) 2 (B) 1 (C) –1 (D) –3

7. Let f(x) be a function satisfying $f'(x) = f(x)$ with $f(0) = 1$ and g(x) be a function that satisfies $f(x) + g(x) = x^2$. Then the value of the integral $\int_{0}^{1}f(x)g(x)dx$, is

(A) $e+\frac{e^2}{2}-\frac{3}{2}$ (B) $e-\frac{e^2}{2}-\frac{3}{2}$ (C) $e+\frac{e^2}{2}+\frac{5}{2}$ (D) $e-\frac{e^2}{2}-\frac{5}{2}$

Space for rough work

8. If $g(x) = \int_0^x \cos 4t\, dx$, then $g(x + \pi)$ equals

(A) $g(x) - g(\pi)$ (B) $g(x) \cdot g(\pi)$ (C) $\frac{g(x)}{g(\pi)}$ (D) $g(x) + g(\pi)$

9. $\int_{-1}^{1}\left[2|x| - |x|^3 + x^3\right] dx =$

(A) 0 (B) 3 (C) $\frac{3}{4}$ (D) $\frac{3}{2}$

10. $\int_0^{100} \sin\left(x - [x]\right)\pi\, dx =$

(A) $\frac{100}{\pi}$ (B) $\frac{200}{\pi}$ (C) 100π (D) 200π

11. If [x] stands for the greatest integer function, then $\int_2^8 \frac{\left[x^2\right] dx}{\left[x^2 - 20x + 100\right] + \left[x^2\right]} =$

(A) 0 (B) 10 (C) 3 (D) 12

12. $\lim_{x\to 0}\left(\frac{\int_0^x \sin^2 t \cos t\, dt}{x^3}\right) =$

(A) 1 (B) $\frac{1}{3}$ (C) 1 (D) ∞

13. If $f(t) = \int_{-t}^{1} \frac{e^{-|x|}}{2} dx$, then $\lim_{t\to\infty} f(t) =$

(A) 1 (B) $\frac{1}{2}$ (C) 0 (D) –1

Space for rough work

14. $\left(\sum_{n=1}^{10}\int_{-2n-1}^{-2n}\sin^{27}x\,dx\right)+\left(\sum_{n=1}^{10}\int_{2n}^{2n+1}\sin^{27}x\,dx\right)=$

(A) 27^2 (B) –54 (C) 54 (D) 0

15. The value of $\lim_{m\to\infty}\frac{\int_0^{\pi/2}\sin^{2m}x\,dx}{\int_0^{\pi/2}\sin^{2m+1}x\,dx}$

(A) 0 (B) $\frac{1}{2}$ (C) 2 (D) none of these

16. For $x\in\left(0,\frac{5\pi}{2}\right)$, define $f(x)=\int_0^x\sqrt{t}\sin t\,dx$, then f has

(A) local minimum at π and local maximum at 2π
(B) local maximum at π and local minimum at 2π
(C) local maximum at π and 2π
(D) local minimum at π and 2π

17. $\lim_{n\to\infty}\left\{\frac{n+1}{n^2+1^2}+\frac{n+2}{n^2+2^2}+\cdots+\frac{1}{n}\right\}=$

(A) $\frac{\pi}{4}+\frac{1}{2}\log 2$ (B) $\frac{\pi}{4}-\frac{1}{2}\log 2$ (C) $\frac{\pi}{2}+\frac{1}{2}\log 2$ (D) none of these

18. If $A=\int_0^{\pi}\frac{\cos x}{(x+2)^2}dx$, then $\int_0^{\pi/2}\frac{\sin 2x}{x+1}dx=$

(A) $\frac{1}{2}+\frac{1}{\pi+2}-A$ (B) $\frac{1}{\pi+2}-A$ (C) A (D) $\frac{1}{A}$

19. $\int_{\log\lambda}^{\log(1/\lambda)}\frac{f\left(\frac{x^2}{3}\right)[f(x)+f(-x)]}{g(3x^2)[g(x)-g(-x)]}dx=$

(A) 0 (B) λ (C) $\frac{1}{\lambda}$ (D) $2\log\lambda$

Space for rough work

20. If a is a positive integer, then the number of values of a satisfying
$\int_0^{\pi/2}\left\{a^2\left(\frac{\cos 3x}{4}+\frac{3}{4}\cos x\right)+a\sin x-20\cos x\right\}dx\le\frac{a^2}{3}$ are
(A) one (B) two (C) three (D) four

21. The area bounded by the curve $y = 2x - x^2$ and the straight line $y = -x$ given by
(A) $\frac{9}{2}$ (B) $\frac{43}{6}$ (C) $\frac{35}{6}$ (D) none of these

22. The area bounded by the curves y = cos x and y = sin x between the ordinates x = 0 and $x = \frac{3\pi}{2}$ is
(A) $4\sqrt{2}-2$ (B) $4\sqrt{2}+2$ (C) $4\sqrt{2}-1$ (D) $4\sqrt{2}+1$

23. The area cut off by the parabola $y^2 = 4ax$ and its latus rectum is
(A) $8a^2$ (B) $4a^2$ (C) $\frac{8a^2}{3}$ (D) $\frac{4a^2}{3}$

24. The area included between the parabola $y^2 = 4ax$, $x^2 = 4by$ is
(A) $\frac{16ab}{3}$ (B) $\frac{16}{5}ab$ (C) $\frac{15}{4}$ (D) none of these

25. The area bounded by the curves y = log x, $y = 2^x$ and the lines $x = \frac{1}{2}$, x = 2 is
(A) $\frac{1}{\log 2}\left(4-\sqrt{2}\right)-\frac{5}{2}\log 2+\frac{3}{2}$ (B) $\log 2\left(4-\sqrt{2}\right)+\frac{3}{2}$
(C) $\frac{5}{2}\log 2+\frac{3}{2}$ (D) none of these

26. The area of the region bounded by the parabola $(y - 2)^2 = x - 1$, the tangent to the parabola at the point (2, 3) and the x-axis is
(A) 6 (B) 9 (C) 12 (D) 3

27. The area of the figure bounded by the curves y = |x – 1| and y = 3 – |x| is
(A) 3 (B) 4 (C) 6 (D) 2

28. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to
(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{4}{3}$ (D) $\frac{5}{3}$

Space for rough work

29. The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines x = 4, y = 4 and the coordinate axes. If S_1, S_2, S_3 are respectively the areas of these pairs numbered from top to bottom; then $S_1 : S_2 : S_3$ is
(A) 1 : 2 : 1 (B) 1 : 2 : 3 (C) 2 : 1 : 2 (D) 1 : 1 : 1

30. Let f(x) be a non-negative continuous function such that the area bounded by the curve y = f(x), x-axis and the ordinates $x = \frac{\pi}{4}$ and $x = \beta > \frac{\pi}{4}$ is $\beta \sin\beta + \frac{\pi}{4}\cos\beta + \sqrt{2}\beta$. Then $f\left(\frac{\pi}{2}\right) =$
(A) $\left(\frac{\pi}{4}+\sqrt{2}-1\right)$ (B) $\left(\frac{\pi}{4}-\sqrt{2}+1\right)$ (C) $\left(1-\frac{\pi}{4}-\sqrt{2}\right)$ (D) $\left(1-\frac{\pi}{4}+\sqrt{2}\right)$

31. If the instantaneous current in a circuit is given by $I = 2\cos(\omega t + \theta)$ the rms value of the current is
(A) 2 amp (B) $\sqrt{2}$ amp (C) $2\sqrt{2}$ amp (D) zero

32. In an AC circuit containing only capacitance, the current
(A) leads voltage by 180^o (B) remains in phase with voltage
(C) leads voltage by 90^o (D) lags voltage by 90^o

33. In an AC circuit, a resistance of R ohm is connected in series with an inductance L. If phase angle between voltage and current be 45^o, the value of inductive reactance will be
(A) R/4 (B) R/2 (C) R (D) cannot be found with the given data

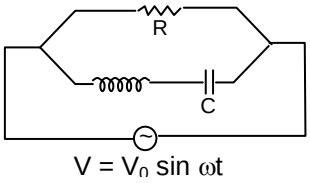
34. An LCR circuit is in the state of resonance. The capacitance is made one-fourth. Then what should be the change in inductance, so that the circuit remains in resonance?
(A) 4 times (B) (1/4) times (C) 8 times (D) 2 times

35. In an AC circuit the potential differences across an inductance and resistance joined in series are respectively 16 V and 20 V. The total potential difference across the circuit is
(A) 20 V (B) 25.6 V (C) 31.9 V (D) 53.5 V

36. An LCR circuit contains resistance of 100 ohm and a supply of 200 volt at 300 radian/sec angular frequency. If only capacitance is taken out from the circuit and the rest of the circuit is joined, current lags behind the voltage by 60^o. If on the other hand, only inductor is taken out the current leads by 60^o with the applied voltage. The current flowing in the circuit is
(A) 1 amp (B) 1.5 amp (C) 2 amp (D) 2.5 amp

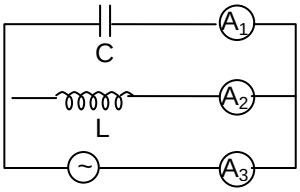
Space for rough work

37. The frequency of the source is gradually increased from a very small value. The current in resistance R will



(A) gradually increase (B) gradually decrease
(C) first increase and then decrease (D) remain unchanged

38. An inductor L, a capacitor C and ammeters A_1, A_2 and A_3 are connected to an oscillator in the circuit as shown in the adjoining figure. When the frequency of the oscillator is increased, then at a particular frequency, the ammeter reading could be zero in the case of

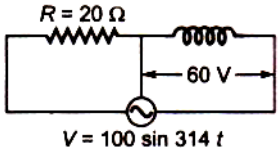


(A) ammeter A_1 (B) ammeter A_2
(C) ammeter A_3 (D) all the three ammeters

39. When an alternating e.m.f $E = E_0 \sin(100t)$ is connected across an inductor (L), the peak current is i_0. On replacing the inductor by a capacitor (C), the r.m.s current becomes 4 times. The possible values of L and C are

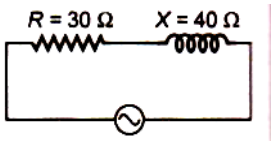
(A) 50 H and 2 μF (B) 100 H and 4 μF
(C) 50 H and 4 μF (D) 100 H and 8 μF

40. If the maximum voltage across the inductor is 60 V, the current in the circuit is



(A) 4 A (B) 2 A
(C) $2\sqrt{2}$A (D) None of these

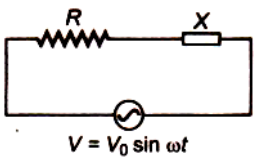
41. At a particular frequency, the current in the circuit is i_1. When the frequency is doubled, the current in the circuit is i_2. Then i_1 / i_2 =



(A) 1.75 (B) 1.7
(C) 1.57 (D) None of these

Space for rough work

42. If $R = 10\Omega$ and the reactance X = 10 Ω, assuming $V_0 = 100$ volt, the rms current in the circuit is



(A) 5A (B) $5\sqrt{2}$A (C) 10 (D) $10\sqrt{2}$

43. A 75 cm string fixed at both ends produces resonant frequencies 384 Hz and 288 Hz without there being any other resonant frequency between these two. Wave speed for the string is
(A) 144 m/s (B) 216 m/s (C) 108 m/s (D) 72 m/s

44. A string of length 'ℓ' is fixed at both ends. It is vibrating in its 3rd overtone with maximum amplitude 'a'. The amplitude at a distance $\frac{\ell}{3}$ from one end is

(A) a (B) 0 (C) $\frac{\sqrt{3}a}{2}$ (D) $\frac{a}{2}$

45. IF the length of a stretched wire is decreased by 40 % and tension is increased by 44 % then ratio of their final and initial fundamental frequencies is
(A) 2 : 1 (B) 1 :2 (C) 3 :2 (D) 3 :1

46. Which of the following is not a wave equation ?
(A) $y = A\sin k\left(x^2 - vt^2\right)$ (B) $y = A\cos\left[2\pi\left(x/\lambda - t\right)\right]$
(C) $y = A\sin\left[2\pi\left(\frac{x}{\lambda} - \frac{t}{T}\right)\right]$ (D) $y = A\sin kx\ \cos\omega t$

47. A transverse wave is described by the equation $y = y_0\ \sin\left[2\pi\left(ft - x/a\right)\right]$. The maximum particle velocity is equal to four times the wave velocity if 'a' is equal to (a wavelength)
(A) $\pi y_0/4$ (B) $\pi y_0/2$ (C) πy_0 (D) $2\pi y_0$

48. Consider the three waves z_1, z_2 and z_3 as $z_1 = A\sin\left(kx - \omega t\right)$, $z_2 = A\sin\left(kx + \omega t\right)$ and $z_3 = A\sin\left(ky - \omega t\right)$. Which of the following represents a standing wave
(A) $z_1 + z_2$ (B) $z_2 + z_3$ (C) $z_3 + z_1$ (D) $z_1 + z_2 + z_3$

Space for rough work

49. Velocity of sound is v. Source and observer move towards each other with velocities v_s and v_0 respectively. Wind is blowing with a velocity v_m in the direction opposite to the propagation of sound; n is the pitch of the sound. The apparent pitch of the sound heard by the observer is

(A) $\left(\frac{v+v_m-v_0}{v+v_m+v_s}\right)n$ (B) $\left(\frac{v-v_m-v_0}{v-v_m+v_s}\right)n$ (C) $\left(\frac{v+v_m-v_0}{v-v_m-v_s}\right)n$ (D) $\left(\frac{v-v_m+v_0}{v-v_m-v_s}\right)n$

50. If the length of a stretched string is shortened by 40% and the tension is increased by 44%, then the ratio of the final and initial fundamental frequencies is

(A) 3 : 4 (B) 4 : 3 (C) 1 : 3 (D) 2 : 1

51. Two waves are represented by the following equations $y_1 = 5 \sin 2\pi(10t - 0.1x)$ and $y_2 = 10 \sin 2\pi(20t - 0.2x)$. Ratio of intensities $\frac{I_2}{I_1}$ will be

(A) 1 (B) 2 (C) 4 (D) 16

52. A sings with a frequency (n) and B sings with a frequency (1/8) that of A. If the energy remains the same and the amplitude of A is a then amplitude of B is

(A) a (B) 2a (C) 8a (D) 16a

53. In order to double the frequency of the fundamental note emitted by a stretched string, the length is reduced to $\frac{3}{4}$ th of the original length and the tension is changed. The factor by which the tension is to be changed is

(A) $\frac{3}{8}$ (B) $\frac{2}{3}$ (C) $\frac{8}{9}$ (D) $\frac{9}{4}$

54. The phase difference between two points 11 m apart is 1320°. The frequency of the wave is 105 Hz. The velocity is

(A) 315 ms^{-1} (B) 4235 ms^{-1} (C) 1155 ms^{-1} (D) 380 ms^{-1}

55. The fundamental frequency of a sonometer wire increases by 5 Hz, if its tension is increased by 21%. The fundamental frequency of the sonometer wire in Hz is

(A) 45 (B) 50 (C) 100 (D) 55

Space for rough work

56. The amplitude of a wave disturbance propagating in the positive x–direction is given by $y = \frac{1}{1+x^2}$ at time t = 0 and $y = \frac{1}{1+(x-1)^2}$ at t = 2 seconds, where x and y are in metres. The shape of the wave disturbance does not change during the propagation. The velocity of the wave is
(A) 1 ms^{-1} (B) 0.5 ms^{-1} (C) 1.5 ms^{-1} (D) 2 ms^{-1}

57. When two waves with same frequency and constant phase difference interfere,
(A) there is a gain of energy
(B) there is a loss of energy
(C) the energy is redistributed and the distribution changes with time
(D) the energy is redistributed and the distribution remains constant in time

Assertion and Reason (Question 58-60)

Directions: Choose the correct option
(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion
(B) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(C) If Assertion is true, but the Reason is false
(D) If Assertion is false but the Reason is true.

58. **Assertion :** A wire is stretched and then fixed at two ends. It oscillates in its second overtone mode. There are total four nodes and three antinodes

Reason : In second overtone mode, length of wire should be $\ell = \frac{3\lambda}{2}$, where λ is wavelength

59. **Assertion :** Standing waves are formed when amplitudes of two constituent waves are equal.

Reason : At any point net displacement at a given time is resultant of displacement of constituent waves.

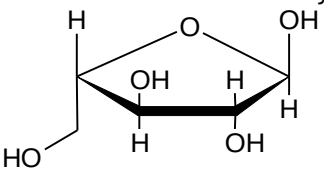
Space for rough work

60. **Assertion :** Ratio of maximum intensity and minimum intensity in interference is 25 : 1. Hence amplitude ratio of two waves should be 3 :2

Reason : $\frac{I_{max}}{I_{min}} = \left(\frac{A_1 + A_2}{A_1 - A_2}\right)^2$

61. A mixture of amylose and amylopectin is called :
(A) lactose (B) starch (C) cellulose (D) sucrose

62. Which set of terms correctly identifies the carbohydrate shown ?



1. Pentose 2. Hexose 3. Aldose 4. Ketose
5. Pyranose 6. Furanose
(A) 1, 3 and 6 (B) 1, 3 and 5 (C) 2, 3 and 5 (D) 2, 3 and 6

63. Which of the following is a reducing sugar?
(A) Glucose (B) Fructose (C) Maltose (D) All

64. Disaccharide sugar is
(A) lactose (B) mannose (C) glucose (D) galactose

65. The reagent which forms crystalline osazone derivative when treated with glucose is
(A) Fehling solution (B) phenyl hydrazine (C) bendict solution (D) hydroxyl amine

66. α–D–(+)–glucose and β–D–(+)–glucose are
(A) epimers (B) anomers (C) enantiomers (D) conformers

Space for rough work

67. $\underset{\substack{(A)\\(\text{Carbohydrate})}}{C_6H_{12}O_6} \xrightarrow{Br_2/H_2O} \underset{(B)}{C_6H_{12}O_7} \xrightarrow{LiAlH_4} (C)$. C in the above series is

(A) Acid (B) Alcohol (C) Alkane (D) Aldehyde

68. Glucose and mannose are

(A) Optical isomers (B) Anomers (C) Epimers (D) Chain isomers

69. α -D-Glucose and β -D-glucose differ from each other due to difference in one carbon with respect to its?

(A) Size of hemiacetal ring (B) Number of OH groups
(C) Configuration (D) Conformation

70. Oxidation of glucose with Ag_2O gives

(A) D-Gluconic acid (B) L-Glucaric acid (C) L-Gluconic acid (D) All

71. In lactose, the reducing part is

(A) Galactose (B) Glucose (C) Fructose (D) Mannose

72. Which of the following treatment will convert starch directly into glucose?

(A) Heating with dil. H_2SO_4 (B) Fermentation by diastase
(C) Fermentation by zymase (D) Heating with dil. $NaOH$

73. α–D–glucose and β–D–glucose differ from each other due to the difference in one of the carbons with respect to its :

(A) configuration (B) number of –OH groups
(C) conformation (D) size of hemiacetal ring

74. Which of the following carbohydrates undergo mutarotation

(A) Fructose (B) Cellulose (C) Maltose (D) Lactose

75. The term anomers of glucose does refers to :

(A) isomers of glucose that differs in configuration at carbons one and four (C–1 and C–(4)
(B) a mixture of (D–) glucose and (L–) glucose
(C) enantiomers of glucose
(D) isomers of glucose that differ in configuration at carbon one (C–(1)

Space for rough work

76. Specific rotation of equilibrium mixture of the three forms of glucose is
(A) 112^o (B) 19^o
(C) 52.7^o (D) 39.7^o

77. Glucose on prolonged heating, with HI gives :
(A) 6–iodohexanal (B) n–Hexane
(C) 1–Hexene (D) Hexanoic acid

78. An alkali is titrated against an acid with methyl orange as indicator, which of the following is a correct combination ?

	Base	**Acid**	**End point**
(A)	Strong	Strong	Pink to colourless
(B)	Weak	Strong	Colourless to pink
(C)	Strong	Strong	Pinkish red to yellow
(D)	Weak	Strong	Yellow to pinkish red

79. An aqueous solution contains an unknown concentration of Ba^{+2}. When 50 mL of a 1 M solution of Na_2SO_4 is added, $BaSO_4$ just begins to precipitate. The final volume is 500 mL. The solubility product of $BaSO_4$ is 1×10^{-10}. What is the original concentration of Ba^{+2} ?
(A) 1.0×10^{-10} M (B) 5×10^{-9} M (C) 2×10^{-9} M (D) 1.1×10^{-9} M

80. An aqueous solution contains 0.10 M H_2S and 0.20 M HCl. If the equilibrium constants for the formation of HS^- from H_2S is 1.0×10^{-7} and that of S^{2-} from HS^- ions is 1.2×10^{-13} then the concentration of S^{2-} ions in aqueous solution is :
(A) 5×10^{-19} (B) 5×10^{-8} (C) 3×10^{-20} (D) 6×10^{-21}

81. Which of the following salts is the most basic in aqueous solution ?
(A) $Pb(CH_3COO)_2$ (B) $Al(CN)_3$
(C) CH_3COOK (D) $FeCl_3$

Space for rough work

82. D(–)–Erythrose $\xrightarrow{NaBH_4}$ P

D(–)–Threose $\xrightarrow{NaBH_4}$ R

Which of the following statement is correct about P and R?
(A) Both are optically active (B) Both are optically inactive
(C) P is optically inactive and R is optically active
(D) Neither P nor R has asymmetric carbon

83. Match List–I with List–II and select the correct answer using the codes given below the Lists.

Column – I		Column – II	
(A)	α–and β–Glucose	(1)	Mutarotation
(B)	(+)–and(–)–Glucose	(2)	Enantiomers
(C)	D–and L–Notations	(3)	Anomers
(D)	α–Form $\rightleftharpoons$ open–chain form $\rightleftharpoons$ β–form	(4)	Configurational relationship

Codes :
(A) A(2) B(3) C(4) D (1)
(B) A(2) B(3) C(1) D (4)
(C) A(3) B(2) C(4) D (1)
(D) A(3) B(2) C(1) D (4)

84.

$C_6H_{12}O_6(A) \xrightarrow{Br_2/H_2O} C_6H_{12}O_7(B)$

$C_6H_{12}O_7(B) \xrightarrow{LiAlH_4} (C)$

Here C is
(A) Acid (B) Alcohol (C) Alkane (D) Aldehyde

85. When methyl D-glucopyranoside is treated with HIO_4 its number of mole consumed per mole of the sugar is:
(A) 2 (B) 3 (C) 4 (D) 5

Space for rough work

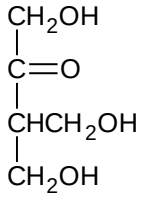
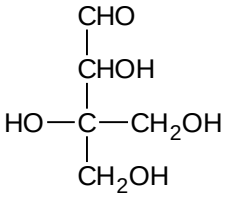
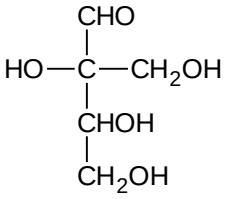
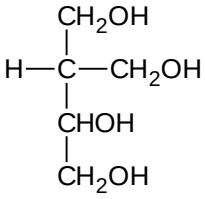
86. 1 molecule of glucose reacts with X number of molecules of phenylhydrazine to yield osazone. The value of X is
(A) three (B) two (C) one (D) four

87. An organic compound(X) with the formula $C_6H_{12}O_6$ forms a yellow crystalline solid with phenylhdrazine and gives a mixture of sorbital and mannitol when reduced with sodium. What is (X)?
(A) Fructose (B) Glucose (C) Xylose (D) Galactose

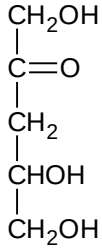
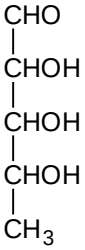
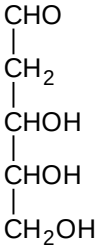
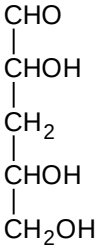
Study the following observation and answer the given questions :

Compounds	Red P + HI	AC_2O/Pyridine	$Br_2 + H_2O$	HIO_4	$PhNHNH_2$
(X) $C_5H_{10}O_5$	Isopentane	Tetraacetate	$C_5H_{10}O_6$	4 Moles	No Osazone
(Y) $C_5H_{10}O_4$	Isopentane	Triacetate	$C_5H_{10}O_5$	1 Mole	Osazone formed
(Z) $C_5H_{10}O_4$	n–pentane	Triacetate	$C_5H_{10}O_5$	2 Moles	Osazone formed

88. Compound 'X' is

(A) 
(B) 
(C) 
(D) 

89. Compound 'Z' is :

(A) 
(B) 
(C) 
(D) 

90. The reducing sugars are :
(A) x and Y (B) X and Z (C) Y and Z (D) All of these

Space for rough work

FIITJEE PET – IX (REG_2ND YEAR)

MAINS_SET–A_ANSWERS

DATE: 22.09.2018

MATHEMATICS

1.	**A**	2.	**C**	3.	**A**	4.	**C**
5.	**B**	6.	**A**	7.	**B**	8.	**D**
9.	**D**	10.	**B**	11.	**C**	12.	**B**
13.	**Bonus**	14.	**D**	15.	**D**	16.	**B**
17.	**A**	18.	**A**	19.	**A**	20.	**D**
21.	**A**	22.	**A**	23.	**C**	24.	**A**
25.	**A**	26.	**B**	27.	**B**	28.	**C**
29.	**D**	30.	**D**				

PHYSICS

31.	**B**	32.	**C**	33.	**C**	34.	**A**
35.	**B**	36.	**C**	37.	**D**	38.	**C**
39.	**B**	40.	**C**	41.	**B**	42.	**A**
43.	**Bonus**	44.	**Bonus**	45.	**Bonus**	46.	**A**
47.	**B**	48.	**Bonus**	49.	**Bonus**	50.	**Bonus**
51.	**Bonus**	52.	**Bonus**	53.	**Bonus**	54.	**A**
55.	**B**	56.	**B**	57.	**D**	58.	**B**
59.	**D**	60.	**A**				

CHEMISTRY

61.	**B**	62.	**A**	63.	**D**	64.	**A**
65.	**B**	66.	**B**	67.	**B**	68.	**C**
69.	**C**	70.	**A, C**	71.	**B**	72.	**A**
73.	**A**	74.	**A, C, D**	75.	**D**	76.	**C**
77.	**B**	78.	**D**	79.	**D**	80.	**C**
81.	**C**	82.	**C**	83.	**C**	84.	**B**
85.	**A**	86.	**A**	87.	**A**	88.	**C**
89.	**D**	90.	**D**				

FIITJEE PET –IX (REG_2ND YEAR)

MAINS_SET–B

DATE: 22.09.2018

Time: 3 hours **Maximum Marks: 360**

INSTRUCTIONS:

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.

   Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.

2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.

3. Attempt all questions.

4. In case you have not darkened any bubble you will be awarded 0 mark for that question.

5. Use of calculator/logarithmic table is not permitted.

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.: ☐☐☐☐☐☐☐☐☐☐

1. For $x \in \left(0, \frac{5\pi}{2}\right)$, define $f(x) = \int_0^x \sqrt{t}\sin t\,dx$, then f has
   (A) local minimum at π and local maximum at 2π
   (B) local maximum at π and local minimum at 2π
   (C) local maximum at π and 2π
   (D) local minimum at π and 2π

2. $\lim_{n\to\infty}\left\{\frac{n+1}{n^2+1^2}+\frac{n+2}{n^2+2^2}+\cdots+\frac{1}{n}\right\} =$
   (A) $\frac{\pi}{4}+\frac{1}{2}\log 2$ (B) $\frac{\pi}{4}-\frac{1}{2}\log 2$ (C) $\frac{\pi}{2}+\frac{1}{2}\log 2$ (D) none of these

3. If $A = \int_0^{\pi}\frac{\cos x}{(x+2)^2}dx$, then $\int_0^{\pi/2}\frac{\sin 2x}{x+1}dx =$
   (A) $\frac{1}{2}+\frac{1}{\pi+2}-A$ (B) $\frac{1}{\pi+2}-A$ (C) A (D) $\frac{1}{A}$

4. $\int_{\log\lambda}^{\log(1/\lambda)}\frac{f\left(\frac{x^2}{3}\right)[f(x)+f(-x)]}{g(3x^2)[g(x)-g(-x)]}dx =$
   (A) 0 (B) λ (C) $\frac{1}{\lambda}$ (D) $2\log\lambda$

5. If a is a positive integer, then the number of values of a satisfying
   $\int_0^{\pi/2}\left\{a^2\left(\frac{\cos 3x}{4}+\frac{3}{4}\cos x\right)+a\sin x-20\cos x\right\}dx \le \frac{a^2}{3}$ are
   (A) one (B) two (C) three (D) four

6. The area bounded by the curve $y = 2x - x^2$ and the straight line $y = -x$ given by
   (A) $\frac{9}{2}$ (B) $\frac{43}{6}$ (C) $\frac{35}{6}$ (D) none of these

Space for rough work

7. The area bounded by the curves y = cos x and y = sin x between the ordinates x = 0 and x = $\frac{3\pi}{2}$ is

(A) $4\sqrt{2}-2$ (B) $4\sqrt{2}+2$ (C) $4\sqrt{2}-1$ (D) $4\sqrt{2}+1$

8. The area cut off by the parabola $y^2 = 4ax$ and its latus rectum is

(A) $8a^2$ (B) $4a^2$ (C) $\frac{8a^2}{3}$ (D) $\frac{4a^2}{3}$

9. The area included between the parabola $y^2 = 4ax$, $x^2 = 4by$ is

(A) $\frac{16ab}{3}$ (B) $\frac{16}{5}ab$ (C) $\frac{15}{4}$ (D) none of these

10. The area bounded by the curves y = log x, $y = 2^x$ and the lines x = $\frac{1}{2}$, x = 2 is

(A) $\frac{1}{\log 2}\left(4-\sqrt{2}\right)-\frac{5}{2}\log 2+\frac{3}{2}$ (B) $\log 2\left(4-\sqrt{2}\right)+\frac{3}{2}$

(C) $\frac{5}{2}\log 2+\frac{3}{2}$ (D) none of these

11. The area of the region bounded by the parabola $(y-2)^2 = x-1$, the tangent to the parabola at the point (2, 3) and the x-axis is

(A) 6 (B) 9 (C) 12 (D) 3

12. The area of the figure bounded by the curves y = |x – 1| and y = 3 – |x| is

(A) 3 (B) 4 (C) 6 (D) 2

13. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{4}{3}$ (D) $\frac{5}{3}$

14. The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines x = 4, y = 4 and the coordinate axes. If S_1, S_2, S_3 are respectively the areas of these pairs numbered from top to bottom; then $S_1 : S_2 : S_3$ is

(A) 1 : 2 : 1 (B) 1 : 2 : 3 (C) 2 : 1 : 2 (D) 1 : 1 : 1

Space for rough work

15. Let f(x) be a non-negative continuous function such that the area bounded by the curve y = f(x), x-axis and the ordinates $x = \frac{\pi}{4}$ and $x = \beta > \frac{\pi}{4}$ is $\beta \sin\beta + \frac{\pi}{4}\cos\beta + \sqrt{2}\beta$. Then $f\left(\frac{\pi}{2}\right) =$

(A) $\left(\frac{\pi}{4}+\sqrt{2}-1\right)$ (B) $\left(\frac{\pi}{4}-\sqrt{2}+1\right)$ (C) $\left(1-\frac{\pi}{4}-\sqrt{2}\right)$ (D) $\left(1-\frac{\pi}{4}+\sqrt{2}\right)$

16. $\int_{-1}^{1}\left\{\left(\frac{x+2}{x-2}\right)^2+\left(\frac{x-2}{x+2}\right)^2-2\right\}^{1/2} dx =$

(A) $8\log\frac{4}{3}$ (B) $8\log\frac{3}{4}$ (C) $4\log\frac{4}{3}$ (D) $4\log\frac{3}{4}$

17. $\int_{0}^{\pi/2}\frac{200\sin x+100\cos x}{\sin x+\cos x}dx =$

(A) 50π (B) 25π (C) 75π (D) 150π

18. Let $I = \int_{0}^{1}\frac{\sin x}{\sqrt{x}}dx$ and $J = \int_{0}^{1}\frac{\cos x}{\sqrt{x}}dx$. Then which of the following is true ?

(A) $I < \frac{2}{3}$ and $J < 2$ (B) $I < \frac{2}{3}$ and $J > 2$ (C) $I > \frac{2}{3}$ and $J < 2$ (D) $I > \frac{2}{3}$ and $J > 2$

19. The value of $\int_{0}^{1}\frac{8\log(1+x)}{1+x^2}dx$ is

(A) $\frac{\pi}{2}\log 2$ (B) $\log 2$ (C) $\pi \log 2$ (D) $\frac{\pi}{8}\log 2$

20. If $I = \int_{0}^{1}\cos\left(2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right)dx$, then

(A) $I > \frac{1}{2}$ (B) $I = -\frac{1}{2}$ (C) $I < \frac{1}{2}$ (D) $I = \frac{1}{2}$

21. If $f(x) = \frac{e^x}{1+e^x}$, $I_1 = \int_{f(-a)}^{f(a)} xg\{x(1-x)\}dx$ and $I_2 = \int_{f(-a)}^{f(a)} g\{x(1-x)\}dx$, then the value of $\frac{I_2}{I_1}$ is

(A) 2 (B) 1 (C) –1 (D) –3

Space for rough work

22. Let f(x) be a function satisfying f′(x) = f(x) with f(0) = 1 and g(x) be a function that satisfies f(x) + g(x) = x^2. Then the value of the integral $\int_0^1 f(x)g(x)\,dx$, is

(A) $e+\frac{e^2}{2}-\frac{3}{2}$ (B) $e-\frac{e^2}{2}-\frac{3}{2}$ (C) $e+\frac{e^2}{2}+\frac{5}{2}$ (D) $e-\frac{e^2}{2}-\frac{5}{2}$

23. If $g(x) = \int_0^x \cos 4t\,dx$, then $g(x + \pi)$ equals

(A) $g(x) - g(\pi)$ (B) $g(x) \cdot g(\pi)$ (C) $\frac{g(x)}{g(\pi)}$ (D) $g(x) + g(\pi)$

24. $\int_{-1}^{1}\left[2|x|-|x|^3+x^3\right]dx =$

(A) 0 (B) 3 (C) $\frac{3}{4}$ (D) $\frac{3}{2}$

25. $\int_0^{100} \sin\left(x-[x]\right)\pi\,dx =$

(A) $\frac{100}{\pi}$ (B) $\frac{200}{\pi}$ (C) 100π (D) 200π

26. If [x] stands for the greatest integer function, then $\int_2^8 \frac{\left[x^2\right]dx}{\left[x^2-20x+100\right]+\left[x^2\right]} =$

(A) 0 (B) 10 (C) 3 (D) 12

27. $\lim_{x\to 0}\left(\frac{\int_0^x \sin^2 t\cos t\,dt}{x^3}\right) =$

(A) 1 (B) $\frac{1}{3}$ (C) 1 (D) ∞

Space for rough work

28. If $f(t) = \int_{-t}^{1} \frac{e^{-|x|}}{2}\,dx$, then $\lim_{t\to\infty} f(t) =$

(A) 1 (B) $\frac{1}{2}$ (C) 0 (D) –1

29. $\left(\sum_{n=1}^{10}\int_{-2n-1}^{-2n} \sin^{27} x\,dx\right)+\left(\sum_{n=1}^{10}\int_{2n}^{2n+1} \sin^{27} x\,dx\right) =$

(A) 27^2 (B) –54 (C) 54 (D) 0

30. The value of $\lim_{m\to\infty} \frac{\int_0^{\pi/2} \sin^{2m} x\,dx}{\int_0^{\pi/2} \sin^{2m+1} x\,dx}$

(A) 0 (B) $\frac{1}{2}$ (C) 2 (D) none of these

31. Which of the following is not a wave equation ?

(A) $y = A\sin k\left(x^2 - vt^2\right)$ (B) $y = A\cos\left[2\pi\left(x/\lambda - t\right)\right]$

(C) $y = A\sin\left[2\pi\left(\frac{x}{\lambda} - \frac{t}{T}\right)\right]$ (D) $y = A\sin kx\ \cos\omega t$

32. A transverse wave is described by the equation $y = y_0\ \sin\left[2\pi\left(ft - x/a\right)\right]$. The maximum particle velocity is equal to four times the wave velocity if 'a' is equal to (a wavelength)

(A) $\pi y_0/4$ (B) $\pi y_0/2$ (C) πy_0 (D) $2\pi y_0$

33. Consider the three waves z_1, z_2 and z_3 as $z_1 = A\sin(kx - \omega t)$, $z_2 = A\sin(kx + \omega t)$ and $z_3 = A\sin(ky - \omega t)$. Which of the following represents a standing wave

(A) $z_1 + z_2$ (B) $z_2 + z_3$ (C) $z_3 + z_1$ (D) $z_1 + z_2 + z_3$

34. Velocity of sound is v. Source and observer move towards each other with velocities v_s and v_0 respectively. Wind is blowing with a velocity v_m in the direction opposite to the propagation of sound; n is the pitch of the sound. The apparent pitch of the sound heard by the observer is

(A) $\left(\frac{v + v_m - v_0}{v + v_m + v_s}\right)n$ (B) $\left(\frac{v - v_m - v_0}{v - v_m + v_s}\right)n$ (C) $\left(\frac{v + v_m - v_0}{v - v_m - v_s}\right)n$ (D) $\left(\frac{v - v_m + v_0}{v - v_m - v_s}\right)n$

Space for rough work

35. If the length of a stretched string is shortened by 40% and the tension is increased by 44%, then the ratio of the final and initial fundamental frequencies is
(A) 3 : 4 (B) 4 : 3 (C) 1 : 3 (D) 2 : 1

36. Two waves are represented by the following equations $y_1 = 5 \sin 2\pi(10t - 0.1x)$ and $y_2 = 10 \sin 2\pi(20t - 0.2x)$. Ratio of intensities $\frac{I_2}{I_1}$ will be
(A) 1 (B) 2 (C) 4 (D) 16

37. A sings with a frequency (n) and B sings with a frequency (1/8) that of A. If the energy remains the same and the amplitude of A is a then amplitude of B is
(A) a (B) 2a (C) 8a (D) 16a

38. In order to double the frequency of the fundamental note emitted by a stretched string, the length is reduced to $\frac{3}{4}$ th of the original length and the tension is changed. The factor by which the tension is to be changed is
(A) $\frac{3}{8}$ (B) $\frac{2}{3}$ (C) $\frac{8}{9}$ (D) $\frac{9}{4}$

39. The phase difference between two points 11 m apart is 1320°. The frequency of the wave is 105 Hz. The velocity is
(A) 315 ms^{-1} (B) 4235 ms^{-1} (C) 1155 ms^{-1} (D) 380 ms^{-1}

40. The fundamental frequency of a sonometer wire increases by 5 Hz, if its tension is increased by 21%. The fundamental frequency of the sonometer wire in Hz is
(A) 45 (B) 50 (C) 100 (D) 55

41. The amplitude of a wave disturbance propagating in the positive x–direction is given by $y = \frac{1}{1+x^2}$ at time t = 0 and $y = \frac{1}{1+(x-1)^2}$ at t = 2 seconds, where x and y are in metres. The shape of the wave disturbance does not change during the propagation. The velocity of the wave is
(A) 1 ms^{-1} (B) 0.5 ms^{-1} (C) 1.5 ms^{-1} (D) 2 ms^{-1}

Space for rough work

42. When two waves with same frequency and constant phase difference interfere,
(A) there is a gain of energy
(B) there is a loss of energy
(C) the energy is redistributed and the distribution changes with time
(D) the energy is redistributed and the distribution remains constant in time

Assertion and Reason (Question 43-45)

Directions: Choose the correct option
(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion
(B) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(C) If Assertion is true, but the Reason is false
(D) If Assertion is false but the Reason is true.

43. **Assertion :** A wire is stretched and then fixed at two ends. It oscillates in its second overtone mode. There are total four nodes and three antinodes

Reason : In second overtone mode, length of wire should be $\ell = \frac{3\lambda}{2}$, where λ is wavelength

44. **Assertion :** Standing waves are formed when amplitudes of two constituent waves are equal.

Reason : At any point net displacement at a given time is resultant of displacement of constituent waves.

45. **Assertion :** Ratio of maximum intensity and minimum intensity in interference is 25 : 1. Hence amplitude ratio of two waves should be 3 :2

Reason : $\frac{I_{max}}{I_{min}} = \left(\frac{A_1 + A_2}{A_1 - A_2}\right)^2$

46. If the instantaneous current in a circuit is given by I = 2 cos ($\omega t + \theta$) the rms value of the current is
(A) 2 amp (B) $\sqrt{2}$ amp (C) $2\sqrt{2}$ amp (D) zero

47. In an AC circuit containing only capacitance, the current
(A) leads voltage by 180^o (B) remains in phase with voltage
(C) leads voltage by 90^o (D) lags voltage by 90^o

Space for rough work

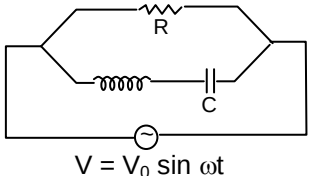
48. In an AC circuit, a resistance of R ohm is connected in series with an inductance L. If phase angle between voltage and current be 45^o, the value of inductive reactance will be
(A) R/4 (B) R/2 (C) R (D) cannot be found with the given data

49. An LCR circuit is in the state of resonance. The capacitance is made one-fourth. Then what should be the change in inductance, so that the circuit remains in resonance?
(A) 4 times (B) (1/4) times (C) 8 times (D) 2 times

50. In an AC circuit the potential differences across an inductance and resistance joined in series are respectively 16 V and 20 V. The total potential difference across the circuit is
(A) 20 V (B) 25.6 V (C) 31.9 V (D) 53.5 V

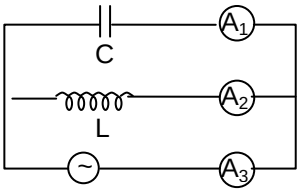
51. An LCR circuit contains resistance of 100 ohm and a supply of 200 volt at 300 radian/sec angular frequency. If only capacitance is taken out from the circuit and the rest of the circuit is joined, current lags behind the voltage by 60^o. If on the other hand, only inductor is taken out the current leads by 60^o with the applied voltage. The current flowing in the circuit is
(A) 1 amp (B) 1.5 amp (C) 2 amp (D) 2.5 amp

52. The frequency of the source is gradually increased from a very small value. The current in resistance R will
(A) gradually increase (B) gradually decrease
(C) first increase and then decrease (D) remain unchanged



$V = V_0 \sin \omega t$

53. An inductor L, a capacitor C and ammeters A_1, A_2 and A_3 are connected to an oscillator in the circuit as shown in the adjoining figure. When the frequency of the oscillator is increased, then at a particular frequency, the ammeter reading could be zero in the case of
(A) ammeter A_1 (B) ammeter A_2
(C) ammeter A_3 (D) all the three ammeters

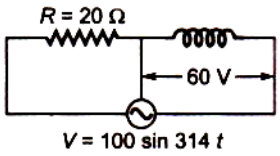


Space for rough work

54. When an alternating e.m.f $E = E_0 \sin(100t)$ is connected across an inductor (L), the peak current is i_0. On replacing the inductor by a capacitor (C), the r.m.s current becomes 4 times. The possible values of L and C are

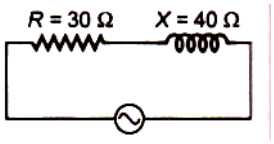
(A) 50 H and 2 μF (B) 100 H and 4 μF
(C) 50 H and 4 μF (D) 100 H and 8 μF

55. If the maximum voltage across the inductor is 60 V, the current in the circuit is



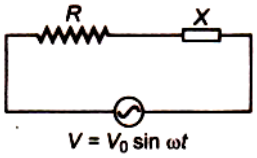
(A) 4 A (B) 2 A
(C) $2\sqrt{2}$A (D) None of these

56. At a particular frequency, the current in the circuit is i_1. When the frequency is doubled, the current in the circuit is i_2. Then i_1 / i_2 =



(A) 1.75 (B) 1.7
(C) 1.57 (D) None of these

57. If $R = 10\Omega$ and the reactance X = 10 Ω, assuming $V_0 = 100$ volt, the rms current in the circuit is



(A) 5A (B) $5\sqrt{2}$A (C) 10 (D) $10\sqrt{2}$

58. A 75 cm string fixed at both ends produces resonant frequencies 384 Hz and 288 Hz without there being any other resonant frequency between these two. Wave speed for the string is

(A) 144 m/s (B) 216 m/s (C) 108 m/s (D) 72 m/s

59. A string of length 'ℓ' is fixed at both ends. It is vibrating in its 3rd overtone with maximum amplitude 'a'. The amplitude at a distance $\frac{\ell}{3}$ from one end is

(A) a (B) 0 (C) $\frac{\sqrt{3}a}{2}$ (D) $\frac{a}{2}$

Space for rough work

60. IF the length of a stretched wire is decreased by 40 % and tension is increased by 44 % then ratio of their final and initial fundamental frequencies is
(A) 2 : 1 (B) 1 :2 (C) 3 :2 (D) 3 :1

61. Specific rotation of equilibrium mixture of the three forms of glucose is
(A) 112^o (B) 19^o (C) 52.7^o (D) 39.7^o

62. Glucose on prolonged heating, with HI gives :
(A) 6–iodohexanal (B) n–Hexane
(C) 1–Hexene (D) Hexanoic acid

63. An alkali is titrated against an acid with methyl orange as indicator, which of the following is a correct combination ?

	Base	**Acid**	**End point**
(A)	Strong	Strong	Pink to colourless
(B)	Weak	Strong	Colourless to pink
(C)	Strong	Strong	Pinkish red to yellow
(D)	Weak	Strong	Yellow to pinkish red

64. An aqueous solution contains an unknown concentration of Ba^{+2}. When 50 mL of a 1 M solution of Na_2SO_4 is added, $BaSO_4$ just begins to precipitate. The final volume is 500 mL. The solubility product of $BaSO_4$ is 1×10^{-10}. What is the original concentration of Ba^{+2} ?
(A) 1.0×10^{-10} M (B) 5×10^{-9} M (C) 2×10^{-9} M (D) 1.1×10^{-9} M

65. An aqueous solution contains 0.10 M H_2S and 0.20 M HCl. If the equilibrium constants for the formation of HS^- from H_2S is 1.0×10^{-7} and that of S^{2-} from HS^- ions is 1.2×10^{-13} then the concentration of S^{2-} ions in aqueous solution is :
(A) 5×10^{-19} (B) 5×10^{-8} (C) 3×10^{-20} (D) 6×10^{-21}

66. Which of the following salts is the most basic in aqueous solution ?
(A) $Pb(CH_3COO)_2$ (B) $Al(CN)_3$
(C) CH_3COOK (D) $FeCl_3$

67. D(–)–Erythrose $\xrightarrow{NaBH_4}$ P

D(–)–Threose $\xrightarrow{NaBH_4}$ R

Which of the following statement is correct about P and R?
(A) Both are optically active (B) Both are optically inactive
(C) P is optically inactive and R is optically active
(D) Neither P nor R has asymmetric carbon

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68. Match List–I with List–II and select the correct answer using the codes given below the Lists.

Column – I		Column – II	
(A)	α–and β–Glucose	(1)	Mutarotation
(B)	(+)–and(–)–Glucose	(2)	Enantiomers
(C)	D–and L–Notations	(3)	Anomers
(D)	α–Form $\rightleftharpoons$ open–chain form $\rightleftharpoons$ β–form	(4)	Configurational relationship

Codes :

(A) A(2) B(3) C(4) D (1)
(B) A(2) B(3) C(1) D (4)
(C) A(3) B(2) C(4) D (1)
(D) A(3) B(2) C(1) D (4)

69.

$$C_6H_{12}O_6(A) \xrightarrow{Br_2/H_2O} C_6H_{12}O_7(B)$$

$$C_6H_{12}O_7(B) \xrightarrow{LiAlH_4} (C)$$

Here C is

(A) Acid (B) Alcohol (C) Alkane (D) Aldehyde

70. When methyl D-glucopyranoside is treated with HIO_4 its number of mole consumed per mole of the sugar is:

(A) 2 (B) 3 (C) 4 (D) 5

71. 1 molecule of glucose reacts with X number of molecules of phenylhydrazine to yield osazone. The value of X is

(A) three (B) two (C) one (D) four

72. An organic compound(X) with the formula $C_6H_{12}O_6$ forms a yellow crystalline solid with phenylhdrazine and gives a mixture of sorbital and mannitol when reduced with sodium. What is (X)?

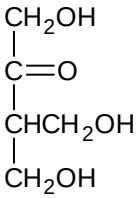
(A) Fructose (B) Glucose (C) Xylose (D) Galactose

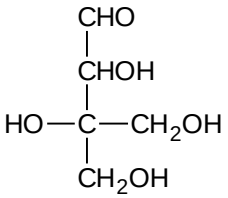
Space for rough work

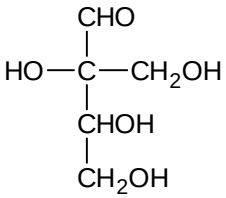
Study the following observation and answer the given questions :

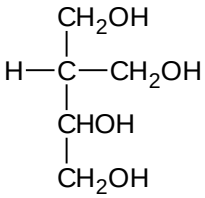
Compounds	Red P + HI	AC_2O/Pyridine	$Br_2 + H_2O$	HIO_4	$PhNHNH_2$
(X) $C_5H_{10}O_5$	Isopentane	Tetraacetate	$C_5H_{10}O_6$	4 Moles	No Osazone
(Y) $C_5H_{10}O_4$	Isopentane	Triacetate	$C_5H_{10}O_5$	1 Mole	Osazone formed
(Z) $C_5H_{10}O_4$	n–pentane	Triacetate	$C_5H_{10}O_5$	2 Moles	Osazone formed

73. Compound 'X' is

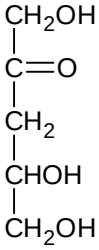
(A) 

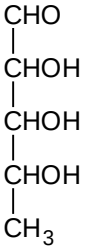
(B) 

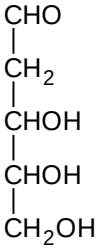
(C) 

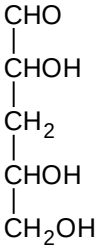
(D) 

74. Compound 'Z' is :

(A) 

(B) 

(C) 

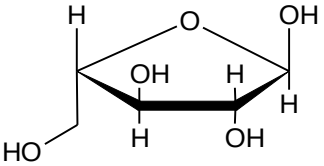
(D) 

75. The reducing sugars are :
(A) x and Y (B) X and Z (C) Y and Z (D) All of these

76. A mixture of amylose and amylopectin is called :
(A) lactose (B) starch (C) cellulose (D) sucrose

Space for rough work

77. Which set of terms correctly identifies the carbohydrate shown ?



1. Pentose 2. Hexose 3. Aldose 4. Ketose
5. Pyranose 6. Furanose

(A) 1, 3 and 6 (B) 1, 3 and 5 (C) 2, 3 and 5 (D) 2, 3 and 6

78. Which of the following is a reducing sugar?

(A) Glucose (B) Fructose (C) Maltose (D) All

79. Disaccharide sugar is

(A) lactose (B) mannose (C) glucose (D) galactose

80. The reagent which forms crystalline osazone derivative when treated with glucose is

(A) Fehling solution (B) phenyl hydrazine (C) bendict solution (D) hydroxyl amine

81. α–D–(+)–glucose and β–D–(+)–glucose are

(A) epimers (B) anomers (C) enantiomers (D) conformers

82. $\underset{\substack{(A)\\(\text{Carbohydrate})}}{C_6H_{12}O_6} \xrightarrow{Br_2/H_2O} \underset{(B)}{C_6H_{12}O_7} \xrightarrow{LiAlH_4} (C)$. C in the above series is

(A) Acid (B) Alcohol (C) Alkane (D) Aldehyde

83. Glucose and mannose are

(A) Optical isomers (B) Anomers (C) Epimers (D) Chain isomers

84. α -D-Glucose and β -D-glucose differ from each other due to difference in one carbon with respect to its?

(A) Size of hemiacetal ring (B) Number of OH groups
(C) Configuration (D) Conformation

Space for rough work

85. Oxidation of glucose with Ag_2O gives
(A) D-Gluconic acid (B) L-Glucaric acid (C) L-Gluconic acid (D) All

86. In lactose, the reducing part is
(A) Galactose (B) Glucose (C) Fructose (D) Mannose

87. Which of the following treatment will convert starch directly into glucose?
(A) Heating with dil. H_2SO_4 (B) Fermentation by diastase
(C) Fermentation by zymase (D) Heating with dil. $NaOH$

88. α–D–glucose and β–D–glucose differ from each other due to the difference in one of the carbons with respect to its :
(A) configuration (B) number of –OH groups
(C) conformation (D) size of hemiacetal ring

89. Which of the following carbohydrates undergo mutarotation
(A) Fructose (B) Cellulose (C) Maltose (D) Lactose

90. The term anomers of glucose does refers to :
(A) isomers of glucose that differs in configuration at carbons one and four (C–1 and C–(4)
(B) a mixture of (D–) glucose and (L–) glucose
(C) enantiomers of glucose
(D) isomers of glucose that differ in configuration at carbon one (C–(1)

Space for rough work

FIITJEE PET – IX (REG_2ND YEAR)

MAINS_SET–B_ANSWERS

DATE: 22.09.2018

MATHEMATICS

1.	**B**	2.	**A**	3.	**A**	4.	**A**
5.	**D**	6.	**A**	7.	**A**	8.	**C**
9.	**A**	10.	**A**	11.	**B**	12.	**B**
13.	**C**	14.	**D**	15.	**D**	16.	**A**
17.	**C**	18.	**A**	19.	**C**	20.	**B**
21.	**A**	22.	**B**	23.	**D**	24.	**D**
25.	**B**	26.	**C**	27.	**B**	28.	**Bonus**
29.	**D**	30.	**D**				

PHYSICS

31.	**A**	32.	**B**	33.	**Bonus**	34.	**Bonus**
35.	**Bonus**	36.	**Bonus**	37.	**Bonus**	38.	**Bonus**
39.	**A**	40.	**B**	41.	**B**	42.	**D**
43.	**B**	44.	**D**	45.	**A**	46.	**B**
47.	**C**	48.	**C**	49.	**A**	50.	**B**
51.	**C**	52.	**D**	53.	**C**	54.	**B**
55.	**C**	56.	**B**	57.	**A**	58.	**Bonus**
59.	**Bonus**	60.	**Bonus**				

CHEMISTRY

61.	**C**	62.	**B**	63.	**D**	64.	**D**
65.	**C**	66.	**C**	67.	**C**	68.	**C**
69.	**B**	70.	**A**	71.	**A**	72.	**A**
73.	**C**	74.	**D**	75.	**D**	76.	**B**
77.	**A**	78.	**D**	79.	**A**	80.	**B**
81.	**B**	82.	**B**	83.	**C**	84.	**C**
85.	**A or C**	86.	**B**	87.	**A**	88.	**A**
89.	**A or C or D**	90.	**D**				