# **MHT-CET 2004**

**Physics Paper** 

1. The harmonics which are present in a pipe, open at one end are - [CET 2004]

- (a) odd harmonics (b) even harmonics
- (c) even as well as odd harmonics
- (d) None of the above

2. A source is moving towards observer with a speed of 20 m/s and having frequency 240 Hz and observer is moving towards source with a velocity of 20 m/s. What is the apparent frequency heard by observer, if velocity of sound is 340 m/s? {CET 2004]

268 Hz

(b) 240 Hz (d) 360 Hz

3. A particle moves for 20 s with velocity 3 m/s and then moves with velocity 4 m/s for another 20 s and finally moves with velocity 5 m/s for next 20 s. What is the average velocity of the particle ? [CET 2004]

(a) 3 m/s	(c) 5 m/s
(	(-), -

(b) 4 m/s (d) zero

4. A gas expands adiabatically at constant pressure, such That its temperature  $T \propto \frac{1}{\sqrt{V}}$ .[CET 2004]

(a)	1.30	(c)	1.67
• •		• • •	

(b) 1.50 (d) 2.00

5. The state of a thermodynamic system is by [CET 2004]

(a) pressure only (b) volume only

(c) pressure, volume and temperature

(d) number of moles

6. Two spheres made of same material have radii in the ratio 2: 1. If both the spheres are at same temperature, then what is the ratio of heat radiation energy emitted per second by them ? [CET 2004]

(a) 1:4 (b) 4:1 c) 3:4 (d) 4:3

7. In Melde's experiment, the string vibrates in 4 loops when a 50 g weight is placed in the pan of weight 15 g. To make the string to vibrates in 6 loops the weight that has to be removed from the pan is [CET 2004]

(a) 0.0007 kg-wt	(c) 0.036 kg-wt
(b) 0.0021 kg-wt	(d) 0.0029 kg-wt

8. A mass m is attached to the end of a rod of length 1. The mass goes around a vertical circular path with the other end hinged at the centre. What should be the minimum velocity of mass at the bottom of the circle, so that the mass completes the circle ? [CET 2004]

# a) $\sqrt{4gl}$ b) $\sqrt{3gl}$ c) $\sqrt{5gl}$ d) $\sqrt{gl}$

9. A sonometer wire of length  $I_1$  vibrates with a frequency 250 Hz. If the length of wire is increased then 2 beats/s are heard. What is ratio of the lengths of the wire ? [CET 2004]

(a) 124: 125 (b) 250:313 (c) 5:3 (d) 41:57

10. The point on the pressure-temperature phase diagram where all the three phases co-exist is called [CET 2004]

- (a) sublimation point (b) fusion point
- (c) triple point (d) vaporisation point

11. Which of the following is the unit of specific heat? [CET2004]

(a) J K  $g^0 \ C^{\text{-1}}$  (b) J / k g  $^0\text{C}$  (c) k g  $^0\text{C/J}$  (d) J /kg  $^0 \ C^{\text{-2}}$ 

12. When light enters water from the vacuum, then the wavelength of light [CET 2004]

(a) decreases (c) remains constant

(b) increases (d) becomes zero

13. The frequency of light in air is  $5 \times 10^{14}$  Hz. What will be the frequency of light, when it enters in the water? [CET 2004]

(a) 2.5 \*  $10^{14}$  Hz (b) 5 ×  $10^{14}$  Hz

(c)  $10^{15}$  Hz (d)  $2.5 \times 10^{12}$  Hz

14. In Young's double slit experiment, a minimum is obtained when the phase difference of superimposing waves is [CET2004]

(a) zero (b) (2n - 1)  $\pi$  c) n  $\pi$  (d) (n + 1)  $\pi$ 

15. A planet has twice the radius but the mean density is 1/4 \* t as compared to earth. What is the ratio of escape velocity from earth to that from the planet ? [CET 2004]

a) 3:1 b) 1:2 c) 1:1 d) 2:1

16. The masses of two planets are in the ratio 1: 2.Their radii are in the ratio 1:2. The acceleration due to gravity on the planets are in the ratio [CET 2004]

(a) 1:2 (b) 2:1 (c) 3:5 (d) 5:3

17. A disc of moment of inertia  $\frac{9.8}{\pi^2}kg - m^2$  is rotating at 600 rpm. If the frequency of rotation changes from 600 rpm to 300 rpm, then what is the work done? [CET2004]

(a) 1467 J (c) 1567 J (b) 1452 J (d) 1632 J

18. The centre of mass of a system of two particles divides. The distance between them is [CET 2004]

(a) in inverse ratio of square of masses of particles

(b) in direct ratio of square of masses of particles

(c) in inverse ratio of masses of particles

(d) in direct ratio of masses of particles

19. If the length of the simple pendulum is increased by 44%, then what is the change in time period of pendulum ? [CET 2004]

(a) 22% (b) 20% c) 33% (d) 44%

20. Time period of a thin magnet is 4 s. If it is divided into two equal halves, then the time period of each part will be [CET 2004]

(a) 4 s (b) 1 s c) 2 s (d) 8 s

21. An SHM is represented by  $x=5\sqrt{2}$  (sin 2  $\pi t$  + cos 2  $\pi t$ ). The amplitude of the SHM is - [CET 2004]

a)10 cm b)20 cm c)  $5\sqrt{2}$  cm d) 50 cm

22. The kinetic energy of a particle executing SHM is 16 J, when it is at its mean position. If the is ass of the particle is 0.32 kg, then what is the maximum velocity of the particle? [CET 2004]

(a) 5 m/s (b) 15 m/s (C)10 m/s (d) 20 m/s

23. A car of mass 800 kg moves on a circular track of radius 40 m. If the coefficient of friction is 0.5, then maximum velocity with which the car can move is [CET 2004]

(a) 7 m/s (b) 14 m/s (c) 8 m/s (d) 12 m/s

24. There is no change in the volume of a wire due to change in its length of stretching. The Poisson's ratio of the material of the wire is [CET 2004]

(a) 0.50 (b) -0.50 (c) 0.25 (d) -0.25

25. The amplitude of two waves are in ratio 5: 2. If all other conditions for the two waves are same, then what is the ratio of their energy densities ? [CET 2004]

(a) 5:2 (b) 5:4 (c) 4:5 (d) 25:4

26. If the surface of a liquid is plane, then the angle of contact of the liquid with the walls of container is [CET2004]

(a) acute angle (b) obtuse angle (c)  $90^{\circ}$  (d)  $0^{\circ}$ 

27. What is the phase difference between two successive crests in the wave ? [CET 2004]

(a)  $\pi$  (b)  $\pi/2$  (c) 2  $\pi$  (d) 4  $\pi$ 

28. The phase difference between two points is  $\pi/3$ . If the frequency of wave is 50 Hz, then what

is the distance between two points  $\ ?$  (given v = 330m / s ) [CET2004]

(a) 2.2 m (b) 1.1 m (c) 0.6 m (d) 1.7 m

29. An infinite line charge produce a field of  $7.182 \times 10^8$  N / C at a distance of 2 cm. The linear charge density is [CET 2004]

(a) 7.27  $\times$   $10^{-4}\,$  C / m  $\,$  (b) 7.98  $\times$   $10^{-4}$  C / m  $\,$ 

(c) 7.11  $\times$   $10^{-4}$  C / m  $\,$  (d) 7.04  $\times$   $10^{-4}$  C / m  $\,$ 

30. An electron experiences a force equal to its weight when placed in an electric field.The intensity of the field will be [CET 2004]

(a)  $1.7 \times 10^{-11}$  N/C (b)  $5.0 \times 10^{-11}$  N / C (c)  $5.5 \times 10^{-11}$  N / c (d) 56 N/C

31. A voltmeter has a resistance of G ohm and range V volt. The value of resistance used in series to convert it into a voltmeter of range nV volt is [CET 2004]

(a) nG (b)  $\frac{G}{n}$  (c) (n - 1) G (d) G/(n - 1)

32. The tangent galvanometers having coils of the same radius are connected in series. Same current flowing in them produces deflections of 60 deg and 45° respectively. The ratio of the number of turns in the coil is [CET 2004]

(a) 
$$\frac{4}{\sqrt{3}}$$
 (b)  $\frac{\sqrt{3}+1}{1}$  (c)  $\frac{\sqrt{3}+1}{\sqrt{3}-1}$  (d)  $\frac{\sqrt{3}}{1}$ 

33. In ballistic galvanometer, the frame on which the coil is wound is non-metallic to [CET 2004]

- (a) avoid the production of induced emf
- (b) avoid the production of eddy currents
- (c) increase the production of eddy currents
- (d) increase the production of induced emf

34. The magnetic potential at a point on the axial line of a bar magnet of dipole moment M is V. What is the magnetic potential due to a bar magnet of dipole moment point? M/4 at the same point? [CET 2004] (a) 4V (b) 2V (c)  $\frac{V}{2}$  (d)  $\frac{V}{4}$ 

35. Which of the following is/are the units of strength of magnetic field at a point ? [CET 2004]

(a) NA  $\,m^{\text{-1}}\,$  (b) NA  $\,m\,$  (c) NA  $^{\text{-1}}\,m^{\,\text{-1}}\,$  (d) NA  $^{\text{-2}}\,m^{\text{-2}}\,$ 

36. A wire of length L metre carrying current I ampere is bent in the form of a circle. What is the magnitude of magnetic dipole moment ? [CET 2004]

(a)  $|L^2/4 \pi$  (b)  $|^2 L^2/4 \pi$  (c)  $|^2 L/8 \pi$  (d)  $|L^2/8 \pi$ 

37. A helicopter rises vertically with a speed of 100 m/s. If helicopter has length 10 m and horizontal component of earth's magnetic field is  $5 \times 10^{-3}$  Wb / m<sup>2</sup> then the induced emf between the tip of nose and tail of helicopter is [CET 2004]

(a) 50 V (b) 0.5 V (c) 5 V (d) 25 V

38. The current which does not contribute to the power consumed in an AC circuit is called [CET 2004]

(a) non-ideal current (b) wattless current

(c) convectional current (d) inductance current

39. An electron (q =  $1.6 \times 10^{-19}$  C) is moving at right angle to the uniform magnetic field  $3.534 \times 10^{-5}$ T .The time taken by the electron to complete a circular orbit is [CET2004]

(a) 2  $\mu$ s (b) 4  $\mu$ s (c) 3  $\mu$ s (d) 1  $\mu$ s

40. What is the time taken by light to cross a glass 2 mm thick ? (Refractive index of glass = 1.5) [CET 2004]

(a)  $10^{-10}$  s (b)  $10^{-12}$  s (c)  $10^{-11}$  s (d)  $10^{9}$  s

41. When a charged particle of charge e revolves in a circular orbit of radius r with frequency n, then orbital current will be [CET2004]

(a)  $\frac{ev}{\pi r^2}$  (b)  $\frac{ev}{4\pi r}$  (c)  $\frac{ev}{2\pi r}$  (d)  $\frac{ev}{4\pi r^2}$ 

42. The electron in a hydrogen atom circles around the proton in  $1.5941 \times 10^{-18}$  s. The

equivalent current due to motion of the electron is [CET 2004]

(a) 127.37 mA (b) 122.49 mA (c) 100.37 mA (d) 94.037 mA

43. What is the ratio of wavelength of radiations emitted, when an electron in hydrogen atom jumps from fourth orbit to second orbit and from third orbit to second orbit ? [CET 2004]

(a) 27:25 (b) 20:27 (c) 20:25 (d) 25:27

44. Light of wavelength 4000 Å is incident on a function of the metal surface? metal surface. The maximum kinetic energy of emitted photoelectron is 2 eV. What is the work function of the metal surface? [CET 2004]

(a) 4 eV (b) 1 eV (c) 2 eV (d) 6 eV

45. The Balmer series of hydrogen spectra lies in [CET 2004]

(a) visible region spectra (b) ultra violet spectra

(c) infrared region spectra (d) y-rays spectra

46. An electron beam is moving between two parallel plates having electric field  $1.125 \times 10^{-6}$  N/m. A magnetic field  $3 \times 10^{-10}$  T is also applied, so that beam of electrons do not deflect. The velocity of the electron is [CET 2004]

(a) 4225 m/s (b)3750 m/s

(c) 2750 m/s (d) 3200 m/s

47. A thick wire is stretched, so that its length become two times. Assuming that there is no change in its density, then what is the ratio of change in resistance of wire to the initial resistance of wire ? [CET 2004]

(a) 2:1 (b) 4:1 (c) 3:1 (d) 1:4

48. The length of the resistance wire is increased by 10%. What is the corresponding change in the resistance of wire ? [CET 2004]

(a) 10% (b) 25 % (c) 21% (d) 9%

49. A circular disc of mass 0.41 kg and radius 10 m rolls without slipping with a velocity of 2 m/s. The total kinetic energy of disc is [CET 2004]

(a) 0.41 J (b) 1.23 J (c) 0.82 J (d) 2.4 J

50. An equilateral prism is made of a material of refractive index v3. The angle of minimum deviation for the prism is [CET 2004]

(a) 90° (b) 60° (c) 45° (d) 30°

Answers

Ν	An								
0	S	0	S	0	S	0	S	0	S
1	Α	11	В	21	Α	31	С	41	С
2	А	12	А	22	С	32	D	42	С
3	В	13	В	23	В	33	В	43	В
4	5	14	В	24	А	34	D	44	В
5	С	15	С	25	D	35	С	45	А
6	В	16	В	26	D	36	А	46	В
7	С	17	А	27	С	37	С	47	С
8	С	18	С	28	D	38	D	48	С
9	А	19	В	29	В	39	D	49	В
10	С	20	С	30	С	40	С	50	В

### Chemistry

1. Geometry of ammonia molecule and the hybridisation of nitrogen involved in it are [CET2004]

(a) sp<sup>3</sup>- hybridisation and tetral edral geometry

(b) sp<sup>3</sup>- hybridisation and distorted tetrahedral geometry

(c) sp<sup>2</sup> - hybridisation and triangular geometry

(d) None of the above

2. Number of electrons in the valence orbit of nitrogen in an ammonia molecule is [CET 2004]

(a) 8 (b) 5 c) 6 d)7

3. Order of reactivity of  $C_2H_6$  ,  $C_2H_4$  and  $C_2H_2$  is [CET2004]

(a) 
$$C_2H_6 > C_2H_4 > C_2H_2$$

(b) $C_2H_2 > C_2H_6 > C_2H_4$	(a)1 (b) 3 (c) 2 (d) 4				
(c) $C_2H_4 > C_2H_2 > C_2H_6$	12. 0.5 M ammonium benzoate is hydrolysed to				
(d) All are equally reactive	[CET 2004]				
4. Be in BeCl <sub>2</sub> undergoes [CET 2004]	(a) 2.5 $ imes$ ! 0 $^{-5}$ (b) 1.5 $ imes$ ! 0 $^{-4}$ (c) 3.125 $ imes$ ! 0 $^{-6}$				
(a) diagonal hybridisation	(d) $6.25 \times 10^{-6}$				
(b) trigonal hybridisation	13. Conjugate base of $HS0_4^-$ is [CET 2004]				
(c) tetrahedral hybridisation	a) $SO_4^{2-}$ (b) $H_2SO_4$ (c) $H_3SO_4^+$ (d) None of				
(d) no hybridisation	14. The pH of the solution 5 mL of $M/10$ mL of				
5. For the reaction [CET 2004]	14. The pH of the solution 5 mL of M/10 mL of $\frac{M}{5}$ HCI + HCl + 10mL of $\frac{M}{10}$ NaOH is [CET 2004]				
$PCI_5(g) \rightarrow PCI_3(g) + CI_2(g)$	(a) 5 (b) 3 (c) 7 (d) 8				
(a) $\Delta H = \Delta E$ (b) $\Delta H > \Delta E$ (c) $\Delta H < \Delta E$ (d) None of these	15. Cod liver oil is [CET 2004]				
<ol> <li>Which of the following is not a state function?</li> <li>[CET 2004]</li> </ol>	(a) an emulsion (b) solution (c) colloidal solution (d) suspension				
(a) Internal energy (b) Enthalpy (c) work (d)	16. Paste is [CET 2004]				
Entropy	(a) suspension of solid in a liquid				
7. Enthalpy (H) is equal to [CET 2004]	(b) mechanical dispersion of a solid in liquid				
(a) internal energy (E)	(c) colloidal solution of a solid in solid				
( b) product of pressure (p) and volume (V) of gas	(d) None of the above				
(c) internal energy (E) + pV	17. The equation for Freundlich adsorption				
(d) work (W) done system	$(x)^{x} = \frac{1}{n} (x)^{x} = $				
8. Copper sulphate solution does not react with [CET 2004]	(a) $\frac{1}{m} = kp^{1/n}$ (b) x=mk $p^{1/n}$ (c) x/m = $kp^{-n}$ (d) All of these				
(a) zinc (b) iron (c) silver (d) All of these	18. Meson was discovered by [CET 2004]				
9. When 1F of electricity is passed through	(a) Yukawa (b) Austin (c) Moseley (d) Einstein				
acidulated water, $O_2$ evolved is [CET 2004] (a) 11.2dm <sup>3</sup> (b) 5.6dm <sup>3</sup> (c) 22.4dm <sup>3</sup> (d) 1.0 dm <sup>3</sup>	19. The following element forms a molecule with eight of its own atoms [CET 2004]				
10 Standard electrode notential of cell	(a) Si (b) S (c) Ci (d) P				
$H_2 H^+  Ag^+ Ag$ is [CET 2004]	20. The disintegration constant of radium with				
(a) 0.8 V (b) -0.8 V (c) -1.2 V (d) 1.2 V	halh-life 1600 yr is [CET 2004]				
11. The pH of millimolar HCl is [CET 2004]					

(a) $2.12 \times 10^{-4} yr^{-1}$ (b) $4.33 \times 10^{-4} yr^{-1}$ (c) $3.26 \times 10^{-3} vr^{-1}$ (d) $4.33 \times 10^{-12} vr^{-1}$	(a) [RNH <sub>3</sub> ]+ HS $o_4^-$				
21 Silicon is [CET 2004]	(b) $[RNH_3]_2^+SO_4^{2-}$				
(1)	(c) R NH <sub>2</sub> . $H_2SO_4$				
(a) semiconductor (b) insulator (c) conductor (d) None of these	(d) no reaction				
22. Coordination number of aluminium is [CET2004]	28. Primary amine (RN <i>H</i> <sub>2</sub> ) reacts with nitrous acid to give [CET 2004]				
(a) 8 (b) 6 (c) 12 (d) 4	(a) $\text{RN}H_3^+$ $NO_2^-$ (b) ROH (c) ROR (d) None of these				
23. Animal charcoal is used in decolorizing colour of liquids because it is a good [CET 2004]	29. IUPAC name of $CH_3$ -CH-CH <sub>3</sub> is				
(a) adsorbate (b) adsorbent (c) oxidizing agent	NH2 [CET 2004]				
(d) reducing agent	(a) dimethyl amine (b) 2-amino propane (c)				
24. If the heat of formation of $CO_2$ is -393 kJ. The amount of heat evolved in the formation of 0.176 Kg of CO <sub>2</sub> is [CET 2004]	30. Fruity smell is given by [CET 2004]				
(a) -1357.9 kJ (b) -1275.9 kJ (c) -1572.0 kJ (d) -	(a) esters (b) alcohols (c) chloroform (d) acid anhydrides				
25. When condensation product of hexamethylenediamine and adipic acid is heated to 353 K (80 0C) in an atmosphere of nitrogen for 4-5 h, the product obtained is [CET 2004]	<ul><li>31. Dimethyl ether and ethyl alcohol are [CET</li><li>2004]</li><li>(a) metamers (b) homologues (c) functional isomers (d) position isomers</li></ul>				
(a) solid polymer of nylon 66	32. CH $_3$ COOC $_2$ H $_5$ with excess of C 2H $_5$ MgBr and				
(b) liquid polymer of nylon 66	hydrolysis gives [CET 2004]				
(c) gaseous polymer of nylon 66	(a) <i>CH</i> <sub>3</sub> -C=O				
(d) liquid polymer of nylon 6	I				
26. Which of the following is used to detect	$C_2H_5$				
aldehydes? [CET 2004]	$C_2H_5$				
(a) Millon's test	(b) $CH_3 - C - OH$				
(b) Tollen's reagent	$C_2H_5$				
(c) Neutral ferric chloride solution	(c) $CH_3 - C = 0$				
(d) Molisch's test	CH <sub>3</sub>				
27. Complete the following reaction [CET 2004]	$C_2H_5$				
RNH2 + H2SO4→	(d) $CH_3 - C = O$				
I					

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Anhy ZnCi<sub>2</sub>
       CH_3
                                                              (d) ROH + HCl
33. which of the acids cannot be prepared by
                                                              39. Acetylene can be obtained by the reaction
Grignard regent? [CET 2004]
                                                              [CET 2004]
                                                              (a) HCOOK <u>Electrolysis</u>
(a) Acetic acid (b) Succinic acid (c) formic acid
(d) All of these
                                                             (b) CHI<sub>3</sub>+ Ag \xrightarrow{\Delta}
34. Tertiary alcohols (3<sup>0</sup>) having atleast four
carbon atoms upon drastic oxidation yield
                                                              (c) CH _{3}CH_{2} OH \frac{Conc H_{2}SO_{4}}{443 K} >
Carboxylic acid with [CET 2004]
                                                              (d) Be<sub>2</sub> C + H<sub>2</sub> O \rightarrow
    (a) One carbon atom less
    (b) Two carbon atoms less
                                                              40. Order of reactivity of halogen acids towards an
    (c) Three carbon atoms less
                                                              alcohol is [CET 2004]
    (d) All the above three options are correct
                                                              (a) HCl > HBr > HI
35. Lactic acid molecule has [CET 2004]
                                                              (b) HBr > HI > HCI
(a) one chiral carbon atom
                                                              (c) HI > HBr > HCl
(b) two chiral carbon atoms
                                                              (d) HI > HCI > HBr
(c) no chiral carbon atom
                                                              41. Dehydrohalogenation of an alkyl halide is a/an
(d) asymmetric molecule
                                                              [CET 2004]
36. Which of the following aldehydes give red
                                                              (a) nucleophilic substitution reaction
precipitate with Fehling solution? [CET 2004]
                                                              (b) elimination reaction
(a) Benzaldehyde
                                                              (c) both nucleophilic substation and elimination
(b) Salicylaldehyde
                                                              reaction
(c) Acetaldehyde
                                                              (d) rearrangement
(d) None of the above
                                                              42. In Wurtz reaction alkyl halide react with [CET
                                                              2004]
37. Aniline reacts with acetaldehyde to form [CET
2004]
                                                              (a) sodium in ether
(a) Schiffs base (b) carbylamine (c) immine (d)
                                                              (b) sodium in dry ether
None of these
                                                              (c) sodium only
38. Best method of preparing alkyl chloride is
                                                              (d) alkyl halide in ether
[CET 2004]
                                                              43. The oxidation state shown by silicon when it
(a) ROH+SOCl<sub>2</sub>\rightarrow
                                                              combines with strongly electropositive metals is
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(b) ROH+  $PCI_5 \rightarrow$ 

(c) ROH+PCI<sub>3</sub>  $\rightarrow$ 

44. Formula of feldspar is [CET 2004]

(a) -2 (b) -4 (c) +4 (d) +2

[CET 2004]

- (a) K<sub>2</sub>o. AI<sub>2</sub>O<sub>3</sub>. 6SiO<sub>2</sub>
- (b)  $K_2O_3$ .  $AI_2O_3$ . 6  $Si_2O_2$ .  $2H_2O_3$
- (c) AI<sub>2</sub>O<sub>3</sub>. 2SIO<sub>2</sub>. 2H<sub>2</sub>O

(d) 3MgO.  $4SiO_2H_2O$ 

45. With cold dilute sodium hydroxide fluorine reacts to give [CET 2004]

(a) NaF and  $OF_2$  (b) NaF+ $O_3$ 

- (b)  $O_2$  and  $O_3$
- (c)  $O_2$  and  $O_3$
- (b) NaF +  $0_2$

46. Which of the following is used in vulcanization of rubber? [CET 2004]

(a)  $SF_6$  (b)  $CF_4$  (c)  $CI_2F_2$  (d)  $C_2F_2$ 

47. Glucose on oxidation gives the acid containing the C-chiral atoms equal to [CET 2004]

(a) 2 (b) 3 (c) 4 (d) 5

- 48. Nitrating mixture is
- (a) fuming nitric acid
- (b) mixture of conc  $H_2SO_4$  and cone  $HNO_3$

(c) mixture of nitric acid and anhydrous zinc chloride

(d) None of the above

49. A  $\xrightarrow{HCI}$  (CH<sub>3</sub>) <sub>2</sub>C=CHCOCH<sub>3</sub>, A is [CET 2004 ]

- (a) acetone
- (b) acetaldehyde
- (c) propionaldehyde
- (d) formaldehyde

50. Formation of alkane by the action of zinc on alkyl halide is called [CET 2004]

(a) Wurtz reaction

(b) Kolbe's reaction

(c) Ulmann's reaction

(d) Frankland reaction

Answers

NO	Ans	NO	Ans	NO	Ans
1	В	11	В	21	А
2	А	12	С	22	В
3	С	13	А	23	А
4	А	14	С	24	С
5	В	15	А	25	В
6	С	16	Α	26	В
7	С	17	D	27	В
8	С	18	А	28	В
9	В	19	В	29	D
10	A	20	В	30	Α

### Mathematics

1. If f(x) is continuous on 
$$[-\pi \pi]$$
, where  
-2 sin x, for  $-\pi \le x \le -\frac{\pi}{2}$ 

F(x)={ A sin x + $\beta$ , for -  $\frac{\pi}{2} < x < \frac{\pi}{2}$ 

Cos x, for  $\frac{\pi}{2} \le x \le \pi$  then a

and eta are [CET 2004]

(a)-1,-1 (b) 1,-1 (c) 1,1 (d) -1,1

2. If p: A man is happy

q: A man is rich

Then, the statement, " If a man is not happy, then he is not rich" is written as [CET 2004]

(a)  $\sim p \rightarrow \sim q$  (b)  $\sim q \rightarrow p$  (c)  $\sim q \rightarrow \sim p$  (d) q  $\rightarrow \sim p$ 

3. If f (x) =  $\{\log_{(1-3x)}(1+3x), \text{ for } x \neq 0 \text{ is } \}$ 

for x =0

continuous at x=0,then k is equal to - [CET 2004]

(a) -2 (b) 2 (c) 1 (d) -1

k

4. Probability  $P(A)=\frac{4}{5}$ ,  $P(B)=\frac{2}{5}$  and  $P(A \cap B) = \frac{1}{2}$ , then  $P(A \cap B')$  is equal to - [CET2004] (a) 3/10 (b) 5/2 (c) 2/5 (d) 5/7 5.  $\lim \left[\frac{3^{x}+3^{-x}-2}{x^{2}}\right]$  is equal to [CET 2004] (a) 2 log 3 (b) - (log 3)<sup>2</sup> (c) - 2 log 3 (d) (log 3)<sup>2</sup>

6. Three students A, B, C solve the problem independently, the probabilities of solving the problem of each of them are  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{5}$  respectively, then the probability that at least one of them solves the problem, is [CET 2004]

(a) 
$$\frac{1}{30}$$
 (b)  $\frac{4}{15}$  (c)  $\frac{29}{30}$  (d)  $\frac{11}{15}$ 

7. H: Set of holidays, S: Set of Sundays and U: Set of day's.

Then, the Venn diagram of statement, 'Every sunday implies holiday' is..... [CET 2004]

(a)

8. If  $x = a \cos^3 \theta$  and  $y = a \sin^3$ , then  $\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ is equal to [CET 2004] (a)  $|\sec \theta|$  (b)  $\sec^2 \theta$  (c)  $\sec \theta$  (d)  $|\tan \theta|$ 9. If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$  then  $A^2 - 5A$  is equal to [CET 20041 (a) 21 (b)-21 (c) 31 (d) null matrix 10. The approximate value of  $(10)^{\frac{1}{3}}$  upto four places of decimal, is [CET 2004] (a) 2.1547 (b) 2.1545 (c) 2.1544 (d) None of these 11. If then A  $\begin{bmatrix} 2 & 1 \\ -1 & 2 \end{bmatrix}$  B =  $\begin{bmatrix} 1 & -2 \\ 2 & 1 \end{bmatrix}$  C =  $\begin{bmatrix} 1 & -3 \\ 2 & 1 \end{bmatrix}$ ,then [CET 2004] (a) A + B = B + A and A + (B + C) = (A + B) + C(b) A + B = B + A and AC = BC(c) A + B = B + A and AB = BC

(d) AC = BC and A = BC12. The derivative of  $\left[\frac{e^{x}+1}{e^{x}}\right]$  is equal to [CET 2004] (a) 0 (b)  $\frac{1}{e^x}$  (c)  $-\frac{1}{e^x}$  (d)  $e^x$ 13. A =  $\begin{bmatrix} -2 & 4 \\ -1 & 2 \end{bmatrix}$  then A<sup>2</sup> is equal to [CET 2004] (a) null matrix (b) unit matrix (c)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$  (d)  $\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$ 14. If x = log(1 + t<sup>2</sup>) and y = t - tan <sup>-1</sup>t . Then,  $\frac{dy}{dx}$  is equal to [CET 2004] (a)  $e^x - 1$  (b)  $t^2 - 1$  (c)  $\frac{\sqrt{e^x - 1}}{2}$  (d)  $e^x - y$ 15.If A = [x y z], B =  $\begin{bmatrix} a & h & g \\ h & b & f \\ a & f & c \end{bmatrix}$  and C= $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ Then, ABC = 0, if [CET 2004] a) $[ax^{2} + by^{2} + cz^{2} + 2gxy + 2fyz + 2czx] =$ 16. Derivative of sin x w.r.t. cos x is [CET 2004] (a)  $\cos x$  (b)  $\cot x$  (c)  $-\cot x$  (d)  $\tan x$ 17. 17. A =  $\begin{bmatrix} 0 & 3 & 3 \\ -3 & 0 & -4 \\ -2 & 4 & 0 \end{bmatrix}$  and B =  $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$  then B'\* (AB) is [CET 2004] (a) null matrix (b) singular matrix (c) unit matrix (d) symmetric matrix 18.  $\frac{d}{dx} (\log x)^4$  is equal to [CET 2004] (a)  $4 \log x^3$  (b)  $4 (\log x)^3$  (c)  $\frac{4(\log x)^3}{x}$ (d)  $(4\log x)^3$ 19. If I is incentre of  $\triangle ABC$ , then I is [CET 2004] (a)  $\frac{a \rightarrow b \rightarrow c \rightarrow c}{a + b + c}$  (b)  $\frac{a \rightarrow b \rightarrow c \rightarrow c}{\sqrt{a^2 + b^2 + c^2}}$  (c)  $\frac{1}{3} \left[ \rightarrow c + a \rightarrow c \rightarrow c \right]$ 20. Primitive of  $cos^{-1} x$  w.r.t. x is [CET 2004]

(a)  $x \cos^{-1} x - \frac{1}{2}\sqrt{1 - x^2 + c}$ (b)  $x \cos^{-1} x - \sqrt{1 - x^2} + c$ (c)  $x \cos^{-1} x + \sqrt{1 - x^2} + c$ (d)  $x \cos^{-1} x + \frac{1}{2}\sqrt{1 - x^2} + c$ 21. A square matrix is an orthogonal matrix, if [CET 2004]

(a) A A' = O (b) A + A' = I (c) A A' = I (d) None of these

22. If y = log(cot x) then  $\int_0^{\pi/2} y \, dx$  is equal to [CET 2004]

(a) 1 (b) 0 (c)  $\pi$  / 2 (d)  $\pi$  / 4

23. A force  $\underset{F}{\rightarrow} = 3\hat{\iota} - \hat{j}$  acts on a point R (0, 1, 1), then the moment of a force about the point P(0, 1, 0) is [CET 2004]

(a)  $3\hat{k}$  (b)  $\hat{i} + 3\hat{j}$  (c)  $-\hat{i} - 3\hat{j}$  d)  $\hat{i} + 3\hat{j} - 3\hat{k}$ 

24.  $\int \frac{1}{\sin^2 x \cdot \cos^2 x} \, dx$  is equal to [CET 2004]

(a)  $\sin x - \cos x + c$  (b)  $\tan x + \cot x + c$ 

(c)  $\cos x + \sin x + c$  (d)  $\tan x - \cot x + c$ 

25. Let  $\vec{a}$  and  $\vec{b}$  are non-zero and non-collinear vectors. If there exists scalars a,  $\vec{B}$  such that

a $\vec{a} + \beta b = 0$ , then [CET 2004]
(a) $a = \beta \neq 0$ (b) $a + \beta = 0$ (c) $a = \beta = 0$ (d) $a \neq 0$
26. Primitive of $\frac{1}{4\sqrt{x}+x}$ is equal to [CET 2004]
(a) $2 \log  1 + 4\sqrt{x}  + c$
(b) $\frac{1}{2} \log  4 - \sqrt{x}  + c$
(c) $2 \log 4 + \sqrt{x}  + c$
$(d)\frac{1}{2}\log 4 + \sqrt{x}  + c$
27. If G is centroid of $\triangle$ ABC then [CET 2004]

(a)  $\vec{G} = \vec{a} + \vec{b} + \vec{c}$  (b)  $\vec{G} = \frac{\vec{a} + \vec{b} + \vec{c}}{2}$ (c)  $3 \vec{G} = \vec{a} + \vec{b} + \vec{c}$  (d)  $3 \vec{G} = \frac{\vec{a} + \vec{b} + \vec{c}}{2}$ 28.  $\int e^x \left( \log x + \frac{1}{x} \right) dx$  is equal to [CET 2004] (a)  $e^x \log x + c + c$  (b)  $\frac{e^x}{\log x} + c$ 

(c) 
$$\frac{\log x}{x}$$
 + c (d)  $\frac{e^x}{x}$  + c

29. A line makes angles a, B, y with the coordinate axes respectively, then  $sin^2 a + sin^2 \beta + sin^2 y$  is equal to [CET 2004]

(a) 1 (b) 3 (c) 2 (d) 4  $30.\int_0^1 \frac{x^2}{1+x^2} dx$  is equal to [CET 2004] (a)  $\frac{\pi}{4} - 1$  (b)  $1 - \frac{\pi}{2}$  (c)  $\frac{\pi}{2} - 1$  (d)  $1 - \frac{\pi}{4}$ 31. Minimize : z=3 x + y, subject to  $2x + 3y \le 6$ , x+y≥ 1,x ≥0, y ≥0 [CET 2004] (a) x =1, y=1 (b) x=0,y =1 (c) x =1,y=0 (d) x =-1, y=-1  $32.\int \frac{dx}{x(x^7+1)}$  is equal to [CET 2004] (a)  $\log\left[\frac{x^7}{x^7+1}\right]$ +c (b)  $\frac{1}{7} \log\left(\frac{x^7}{x^7+1}\right)$ +c c)  $\log\left(\frac{x^{7}+1}{x^{7}}\right)$  +c (d)  $\frac{1}{7}\log\left(\frac{x^{7}+1}{x^{7}}\right)$  +c 33. The shaded region for the inequality  $x + 5y \le 6$ is [CET 2004] (a) to the non-origin side of x + 5y = 6(b) to the either side of x + 5y = 6(c) to the origin side of x + 5y = 6(d) to the neither side of x + 5y = 634. The solution of the differential equation  $\frac{dx}{x} + \frac{dy}{y} = 0$  is [CET 2004]

(a) xy = c (b)x+y=c (c)  $\log x \log y = c$  (d)  $x^2 + y^2 = c$  35. A LPP means [CET2004]

(a) only objective function is linear

(b) only constraints are linear

c) either objective function or constraints are linear

(d) all objective function and constraints are linear

36. The differential equation obtained by eliminating arbitrary constants from  $y = a \cdot e^{bx}$  is [CET 2004]

(a)  $y \frac{d^2 y}{dx^2} + \frac{dy}{dx} = 0$  (b)  $y \frac{d^2 y}{dx^2} - \frac{dy}{dx} = 0$ (c)  $y \frac{d^2 y}{dx^2} - \left(\frac{dy}{dx}\right)^2 = 0$  (d)  $y \frac{d^2 y}{dx^2} +$ 

37. f(x) is a polynomial of degree 2, f(0) = 4 f' \* (0)
= 3 and f' '(0) = 4 , then f(- 1) is equal to [CET 2004]

(a) 3 (b) -2 (c) 2 (d) -3

38. Solution of differential equation sec x dy - cosec y dx = 0 is - [CET 2004]

(a)  $\cos x + \sin y = c$  (c)  $\sin y - \cos x = c$ 

(b)  $\sin x + \cos y = c$  (d)  $\cos y - \sin x = c$ 

39. The point P(9/2,6) lies parabola y  $^{2}$  = 4ax then parameter of the point P is [CET 2004]

(a)  $\frac{3a}{2}$  (b)  $\frac{2}{3a}$  (c)  $\frac{2}{3}$  (d)  $\frac{3}{2}$ 

40. Using Trapezoidal rule and following table  $\int_0^8 f(x) dx$  is equal to [CET 2004]

	0	2	4		
х				6	8
	2				
fx		5	10	17	26
(a) 184	(b)92	2 (c) 46	(d)-36		

41. The tengths of tangent from point P to circles  $x^2 + y^2 + 4x + 6y + 8 = 0$  and  $x^2 + y^2 = 5$  are equal, then the equation of locus of point P is [CET 2004]

(a) 4x + 6y + 13 = 0 (b) 4x + 6y + 33 = 0

(c) 4x + 6y + 3 = 0 (d) 4x + 6y - 17 = 0

42. The value of  $\Delta^2$  [ $bx^2$ ] is equal to [CET 2004]

(a) 2bh (b) 4 bh (c)  $2bh^2$  (d)  $2b^2h$ 

43. The equation of circle is  $x^2 + y^2 - 2x = 0$  The point P(- 1,0) lies [CET 2004]

(a) on the circle (b) inside the circle

(c) outside the circle (d) on the centre of the circle

44. $\frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$  is equal to - [CET 2004]

(a) 0 (b)  $\Delta$  -  $\nabla$  (c)  $\nabla$  -  $\Delta$  (d)  $\Delta$  +  $\nabla$ 

45. The sum of slopes of lines  $3x^2 + 5xy - 2y^2 = 0$  is [CET 2004]

(a)  $-\frac{5}{3}$  (b)  $\frac{5}{2}$  (c)  $-\frac{5}{2}$  (d)  $-\frac{2}{3}$ 

46. Let  $\vec{a}, \vec{b}$  and  $\vec{c}$  be vectors with magnitudes 3, 4 and 5 respectively and  $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ , then the value of  $\vec{a} \ \vec{b} + \vec{b} \ \vec{c} + \vec{c} \ \vec{a}$  is [CET 2004]

(a) 47 (b) 25 (c) 50 (d) - 25

47. The equation of tangent to the ellipse  $x^2 + 4y^2 = 5 at (-1,1)$ , is [CET 2004]

(a) x + 4y + 5 = 0 (c) x + 4y-5=0

b) x-4y-5=0 (d) x-4y+5=0

48. If  $x^3$ -3x-1 = 0, then by Newton Raphson method,  $x_{n+1}$  is equal to [CET 2004]

(a) 
$$\frac{2x_n^{3-1}}{3(x_n^2-1)}$$
 (b)  $\frac{2x_n^{3+1}}{3(x_n^2-1)}$  (c)  $\frac{2x_n^{3-1}}{(x_n^2-1)}$  (d)  $\frac{2x_n^{3+1}}{(x_n^2-1)}$ 

49. The focal chord of a conic perpendicular to axis is - [CET 2004]

(a) tangent (b) vertex

(c) focal distance (d) latus rectum

50. Unbiased die is thrown, probability that outcome is greater than 4, is [CET 2004]

## (a) ¾ (b) 4/5 (c) 1/3 (d) 5/6

#### Answers

No	а	no	ans	no	ans	no	а	no	Ans
	ns						n		
							S		
1	b	11	а	21	С	31	b	41	а
2	а	12	С	22	b	32	b	42	С
3	d	13	а	23	b	33	С	43	С
4	а	14	С	24	d	34	а	44	d
5	d	15	d	25	С	35	d	45	b
6	d	16	С	26	С	36	С	46	d
7	с	17	а	27	С	37	а	47	d
8	а	18	С	28	а	38	b	48	b
9	а	19	а	29	С	39	d	49	d
10	С	20	b	30	d	40	b	50	С

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