

**Tribhuvan University
Central Department of Food Technology
M. Tech. (food) Bridge Course
Entrance Exam Model Question**

Full Mark:100

Pass Mark:35

Time: 2 Hours

Select the most appropriate answer in the answer sheet given at the end of this question paper.

Physics

- Gravitational potential at the centre of the earth is given by
(a) $-\frac{3}{2} \frac{GM}{R}$ (b) $-\frac{2}{3} \frac{GM}{R}$ (c) $-\frac{GM}{R}$ (d) $-\frac{2}{3} \frac{GM}{R}$
- Kepler's harmonic law for planetary motion is stated as
(a) $T \propto r$ (b) $T^2 \propto r^3$ (c) $T \propto r^{2/3}$ (d) $T \propto r^{1/3}$
- Moment of inertia of a solid cylinder about an axis through c.g. and perpendicular to its axis is
(a) $\frac{1}{2} MR^2$ (b) $M \left(\frac{l^2}{12} + \frac{R^2}{4} \right)$ (c) $\frac{5}{3} MR^2$ (d) $\frac{2}{3} MR^2$
- When two springs are connected in series the spring constant of the combination become
(a) $k_1 + k_2$ (b) $\sqrt{k_1 k_2}$ (c) $\frac{k_1 k_2}{k_1 + k_2}$ (d) $\frac{k_1 + k_2}{k_1 k_2}$
- Particle velocity of a plane progressive wave is
(a) $2\pi \frac{v}{\lambda} a \cos \frac{2\pi}{\lambda} (vt - x)$ (b) $-2\pi \frac{v}{\lambda} a \cos \frac{2\pi}{\lambda} (vt - x)$
(c) $-\frac{2\pi}{\lambda} a \cos \frac{2\pi}{\lambda} (vt - x)$ (d) $n\lambda$
- The three elastic constants are related by
(a) $Y = \eta + k$ (b) $\frac{Y}{2} = 3\eta + 5k$ (c) $\frac{1}{Y} = \frac{3}{\eta} + \frac{1}{k}$ (d) $\frac{9}{Y} = \frac{3}{\eta} + \frac{1}{k}$
- Reflection of a wave from denser medium produces a phase change of
(a) $\frac{\pi}{2}$ (b) π (c) $\frac{\pi}{4}$ (d) 2π
- Obliquity factor is proportional
(a) $\cos \theta$ (b) $\cos^2 \theta$ (c) $(1 + \cos \theta)$ (d) $(1 + \cos^2 \theta)$
- In zone plate the radii of zones are proportional to the
(a) natural number (b) square root of natural number
(c) square of natural number (d) none

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10. In Fresnel's diffraction assuming whole of wave front the intensity at a point is
(a) only one fourth of that due to the first half period zone
(b) only one and half due to the first half period zone
(c) equal the that due to the first half period zone
(d) zero
11. The percent of vibration perpendicular to the plane of paper reflection from plane mirror is
(a) 85% (b) 100% (c) 50% (d) 40%
12. γ radiation has wave length
(a) longer than α & β rays (b) shorter than α & β rays
(c) equal the α & β rays (d) lies in the region of visible light
13. At absolute zero a gas
(a) remains as gas (b) liquefied (c) solidified (d) goes to plasma states
14. Temperature of a gas is the result of
(a) KE (b) PE
(c) Both KE & PE (d) Atmospheric temperature
15. Coulomb's law electrostatics holds good for separation
(a) More than 10^{-15} m (b) less than 10^{-15} m
(c) For all separations (d) none
16. The magnetic moment of a current loop is given by
(a) $\frac{e}{2mL}$ (b) $\frac{eL}{2m}$ (c) $\frac{L}{2em}$ (d) $\frac{1}{2emL}$
17. For sharper resonances in LCR circuit the value of L/C should be
(a) less (b) large (c) does not matter (d) L should be less
18. In transformer eddy current loss is minimized by taking
(a) Thin iron core (b) Thick iron core
(c) Laminated iron cores insulated from each other (d) taking core of insulation
19. Cyclotron accelerates the charged particles by applying
(a) Only electric field (b) Only magnetic field
(c) Both electric & magnetic fields (d) Neither of the fields
20. Half life and mean life of a radioactive sample are related by
(a) Half life = mean life (b) Half life = $\frac{1}{\text{mean life}}$
(c) Half life = 0.693 x mean life (d) Half life = 0.693/mean life
21. Force between parallel currents is given by
(a) $\frac{\mu_0 I_1 I_2 \ell}{A \pi}$ (b) $\frac{\mu_0 I_1 I_2}{2 \pi a}$ (c) $\frac{\mu_0 I_1 I_2}{2 \pi a \ell}$ (d) $\frac{\mu_0 I_1 I_2 \ell}{2 \pi a}$
22. To minimize the losses in A.C. circuits a choke coil of inductance
(a) Very high is taken (b) very low is taken (c) zero is taken (d) does not depend

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23. Meissner's effect is related with
(a) conductor (b) insulator (c) super conductor (d) all
24. Current gain is more than 1 in
(a) Common base (b) Common collector
(c) Common emitter (d) In all the above three
25. Decimal number of 10 when converted binary number becomes.
(a) 1010 (b) 1011 (c) 1110 (d) 101
26. NAND gates is a combination of
(a) OR and AND gates (b) NOT and OR gates
(c) AND and NOT gates (d) is not a combination
27. Frank and Hertz experiment is for
(a) Quantization of energy (b) Dual nature of matter
(c) Uncertainty principle (d) None of the above
28. Malus law says that intensity after analyzer is proportional to
(a) $\cos^2 \theta$ (b) $\frac{1}{\cos^2 \theta}$ (c) $\cos \theta$ (d) $\frac{1}{\cos \theta}$
29. Elementary particles are
(a) Electron Proton and neutron (b) Atoms
(c) Quarks (d) All above
30. Entropy of a system during irreversible process
(a) Remains the same (d) Decreases
(c) Increases (d) initially decreases than increases

Chemistry

1. The hybridization of iron in $[FeF_6]^{3-}$ is
(a) sp^3d (b) sp^3d^2 (c) dsp^2 (d) sp^3
2. Which of the following molecule would be expected to have zero dipole moments
(a) C_6H_5Cl (b) NH_3 (c) C_6H_6 (d) $CHCl_3$
3. The root mean square velocity of hydrogen molecule at $0^\circ C$ is
(a) 1840 ms^{-1} (b) $18.40 \times 10^5 \text{ ms}^{-1}$ (c) 6.13 ms^{-1} (d) 3680 ms^{-1}
4. The most appropriate statement is
(a) Vapour pressure of all the liquids is the same at $373K$
(b) Vapour pressure of all the liquids is the same at their freezing point
(c) Vapour pressure of all the liquids decrease with increasing volume of the container
(d) Vapour pressure of all the liquids increases with the rise in temperature
5. Which one of the following is not state function?
(a) V (b) $\frac{q}{T}$ (c) $E + PV$ (d) $\frac{q}{W}$

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6. Which solution would show highest value of colligative property at 300 K?
(a) 1 M sucrose (b) 1 M BaCl₂ (c) 1 M KCl (d) 1 M Urea
7. The most alkaline 0.1 M aqueous solutions of following is
(a) KCl (b) NH₄NO₃ (c) HCOONa (d) CH₃COONH₄
8. The Standard electrode potential for A⁺⁺/A and B⁺⁺/B are -0.126 v and -0.763 v respectively, the e.m.f. of the cell A/A⁺⁺(0.1 M) //B⁺⁺ (0.1 M)/B is
(a) 0.889 v (b) 0.637 v (c) greater than 0.637 v (d) less than 0.637 v
9. Arrhenius equation is
(a) $K = -Ae^{-E_a/RT}$ (b) $K = e^{-E_a/RT}$ (c) $K = Ae^{-E_a/RT}$ (d) $K = Ae^{E_a/RT}$
10. In which of the following conditions, reaction is spontaneous at all temperatures
(a) $\Delta H < 0; \Delta S = 0$ (b) $\Delta H < 0; \Delta S < 0$
(c) $\Delta H > 0; \Delta S > 0$ (d) $\Delta H < 0; \Delta S > 0$
11. In (4n+2) radioactive series, the parent element is
(a) ${}_{92}^{235}U$ (b) ${}_{90}^{232}Th$ (c) ${}_{92}^{238}U$ (d) ${}_{93}^{237}Np$
12. Among the following, which one is the most soluble in water
(a) Li F (b) Li Cl (c) Li Br (d) Li I
13. In the standardization of Na₂S₂O₃ using K₂Cr₂O₇ by iodometry, the equivalent weight of K₂Cr₂O₇ is
(a) Molecular weight/2 (b) Molecular weight/6
(c) Molecular weight/3 (d) Same as molecular weight
14. The Number and type of bonds between two carbon atoms in CaC₂ are
(a) One σ and one π (b) One σ
(c) One σ and one a half π bonds (d) One σ and two π bonds
15. The ligand which is attached to the central metal ion through either of the two different atoms in called
(a) Polydentate ligand (b) Chelate ligand
(c) Ambident ligand (d) Neutral ligand
16. Arsenic sulphide solution is
(a) Negative collid (b) positive colloid (c) neutral colloid (d) dipolar colloid
17. The inner-transition elements are the elements in which the added electrons go to
(a) (n-1)d orbitals (b) (n-1)d and ns orbitals
(c) (n-1)f orbitals (d) (n-1)d and (n-2) f orbitals
18. Mg²⁺ is not isoelectronic with
(a) Al³⁺ (b) Ne (c) O²⁻ (d) Ca²⁺
19. The number of isoprene units in the class of diterpenes is
(a) 2 (b) 3 (c) 4 (d) 6
20. The product obtained from heating a mixture of pyridine and potassium nitrate in the presence of H₂SO₄ at 300⁰ C is
(a) 3-nitropyridine (b) 4-nitropyridine
(c) 2-nitropyridine (d) 3,4dinitro pyridine

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21. One part per million(1ppm) is the same as,
(a) 1 mg/g (b) 1 µg/kg
(c) 1 ng/mg (d) all of the above are correct
22. When an aromatic aldehyde is heated with the anhydride of an aliphatic acid in the presence of the sodium salt of the same acid as a catalyst, the reaction is called
(a) Benzoin condensation (b) Perkin condensation
(c) Clasian condensation (d) Knoevenagel condensation
23. Which of the following does not show aromaticity,
(a) Pyrrole (b) Napthalene (c) Cyclohexene (d) Pyridine
24. Penicillin may be represented by the formula $C_9H_{11}N_2O_4S-R$ the penicillin with $R=C_6H_5-CH-NH_2$ is
(a) penicillin-F (b) penicillin-G (c) penicillin-K (d) ampicillin
25. Which one of the following can reduce the Fehling's solution to red cuprous oxide
(a) Lactose (b) Sucrose (c) Glycogen (d) Glucose
26. Which of the following enzymes hydrolyses triglycerides to fatty acids and glycerol?
(a) Amylase (b) lipase (c) pepsin (d) maltose
27. Which of the following alcohols is the most reactive with Lucas reagent
(a) $(CH_3)_3COH$ (b) $(CH_3)_2CHCH_2OH$ (c) $(CH_3)_2CHOH$ (d) CH_3OH
28. CH_3CHO reacts with hydroxylamine to give
(a) hemi-acetal (b) acetal (c) hydrazone (d) acetaldoxime
29. The major product "A" of the reaction $CH_3CH_2CHClCH_3 \xrightarrow{KOH(alc)} A$ is
(a) 2-Butene (b) 1-Butene (c) 1-Butanol (d) 2-Butanol
30. Which of the following molecules does not possess enantiomers ?
(a) $CH_3CH_2CH_2CHBrCH_3$ (b) $CH_3CH_2CH_2CBr_2CH_3$
(c) $CH_3CHBrCH_2CH_3$ (d) $CHBr_2CH_2CHBrCH_3$

Maths

1. $\lim_{x \rightarrow 0} x \sin \frac{1}{x}$ is equal to
(a) 1 (b) 0 (c) ∞ (d) oscillatory
2. If $y = 2^{2^x}$ then $\frac{dy}{dx} =$
(a) $y(\log_{10} 2)^2$ (b) $y \cdot \log_e 2^2$ (c) $y \cdot 2^x (\log_e 2)^2$ (d) $y \log_e 2^2$
3. If $\vec{r} = a \cos t \vec{i} + a \sin t \vec{j} + t \vec{k}$ then $\left| \frac{d^2 \vec{r}}{dt^2} \right| =$
(a) $a+t^2$ (b) a (c) $-a$ (d) 0
4. Which two of the function $\sin x, e^x$ and $\log x$ are continuous at $x = 0$
(a) $\sin x$ and e^x (b) $\sin x$ and $\log x$ (c) e^x and $\log x$ (d) None of these

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5. What is the length of perpendicular drawn from origin to the line $\frac{x}{3} + \frac{y}{4} = 1$
- (a) $\frac{5}{12}$ (b) $\frac{12}{5}$ (c) $\frac{1}{7}$ (d) $\frac{1}{2}$
6. If $\cos^{-1}x + \cos^{-1}y = \frac{\pi}{2}$ then $x^2 + y^2$ is equal to
- (a) e (b) $\frac{1}{e}$ (c) 1 (d) 0
7. $x^2 + y^2 = 25$ then $\frac{dy}{dx} =$
- (a) $\frac{x}{5}$ (b) $\frac{y}{x}$ (c) $-\frac{y}{x}$ (d) $-\frac{x}{y}$
8. The Series $\frac{2}{1!} + \frac{4}{3!} + \frac{6}{5!} + \dots$ to ∞ is
- (a) $\frac{1}{e}$ (b) $\frac{12}{5!}$ (c) e (d) 0
9. If $\vec{r} = x\vec{I} + y\vec{J} + z\vec{K}$ then find $\angle \vec{r}$
- (a) 0 (b) 1 (c) 2 (d) 3
10. $y = e^{\tan^{-1}x}$ then $(1+x^2)y_{n+2} + [2(n+1)x-1]y_{n+1} =$
- (a) $n^2 y_n$ (b) $n(n+1)y_n$ (c) $-n(n+1)y_n$ (d) $-n^2 y_n$
11. The sum of the series $1 + \frac{3}{4} + \frac{7}{16} + \frac{15}{64} + \dots$ to ∞ is
- (a) $\frac{2}{3}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$ (d) $\frac{8}{3}$
12. $\int_0^1 \log(1+x)$ is equal to
- (a) $\log 2 - \log 0$ (b) $\log 2 - 1$ (c) $2 \log 2 - 1$ (d) $\log 2$
13. The eccentricity of rectangular hyperbola is
- (a) $\frac{1}{2}$ (b) 1 (c) 2 (d) $\sqrt{2}$
14. If $\cos x = a_0 + a_1x + a_2x^2 + \dots$ then the value of $a_3 =$
- (a) 0 (b) -1 (c) 1 (d) $-\frac{1}{3!}$
15. Angle of intersection of the curves $r = a(1 + \cos \theta)$, $r = b(1 - \cos \theta)$
- (a) π (b) $\frac{\pi}{2}$ (c) 0 (d) $-\frac{\pi}{2}$

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16. The asymptotes of the curve $x^2y^2 - a^2(x^2 + y^2) = 0$ form a

- (a) Circle (b) Triangle (c) Square (d) Pentagon

17. If $\frac{dy}{dx} = \frac{e^y}{x}$ then

- (a) $e^{-y} + \log x + c = 0$ (b) $e^y + \log x + c = 0$
(c) $x + e^y + c = 0$ (d) None of them

18. In which condition that the line $\frac{L}{r} = A \cos \theta + B \sin \theta$ may touch the conic

$$\frac{L}{r} = 1 + e \cos \theta$$

- (a) $(A - B)^2 = 1$ (b) $(A - e)^2 + B^2 = 1$ (c) $A^2 - e^2 - B^2 = 1$ (d) $(B - e)^2 + A = 1$

19. In a Class 15 of boys and 10 girls in how many ways may a committee made up of 3 boys and 2 girls be selected

- (a) 20475 (b) 20375 (c) 20575 (d) 19475

20. Angle between two vectors \vec{a} and \vec{b} is

- (a) $\cos \theta = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| |\vec{b}|}$ (b) $\cos \theta = \frac{\vec{a} \times \vec{b}}{\vec{a} \cdot \vec{b}}$ (c) $\cos \theta = \frac{\vec{a} \times \vec{b}}{|\vec{a}| |\vec{b}|}$ (d) $\sin \theta = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| |\vec{b}|}$

21. If 4 dices are thrown, what is the probability of getting no sixes

- (a) $\frac{625}{616}$ (b) $\frac{625}{1296}$ (c) $\frac{25}{1296}$ (d) 0

22. If $P(A) = \frac{1}{7}$ and $P(B) = \frac{1}{10}$, A and B are independent but not mutually exclusive events then $P(A + B) =$

- (a) $\frac{1}{70}$ (b) $\frac{17}{70}$ (c) $\frac{16}{70}$ (d) $\frac{69}{70}$

23. Which of the following is a measure of dispersion?

- (a) Mean (b) Median (c) Mode (d) Mean deviation

24. The Property of a curve is not symmetrical is called

- (a) Mode (b) Variance (c) Skewness (d) Correlation.

25. The value of $\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} =$

- (a) 0 (b) 1 (c) e (d) ∞

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26. A conic section with eccentricity is equal to 1 is called a/an
(a) Circle (b) Ellipse (c) Parabola (d) Hyperbola
27. If w is complex root of unity then $(1 - w + w^2)^6 + 1 + w + w^2 =$
(a) 8 (b) 0 (c) 48 (d) 64
28. Which of the following is the Cauchy's form of Remainder R_n in Taylor's series?
(a) $\frac{h^n}{n!} f^n(a + \theta h)$ (b) $\frac{x^n}{n!} f^n(a + \theta h)$
(c) $\frac{x^n}{(n-1)!} (1 - \theta)^{n-1} f^n(x)$ (d) $\frac{h^n}{(n-1)!} (1 - \theta)^{n-1} f^n(a + \theta h)$
29. A differential equation of the form $y = Px + f(P)$
(a) linear equation (b) Bernoulli's equation
(c) Clairaut's equation (d) exact equation
30. The Curve $r = a(1 + \cos \theta)$ is called
(a) Catenary (b) cycloid (c) hypo-cycloid (d) Cardioid

General Knowledge

1. The functions of food are
(a) Energy giving (b) Body building
(c) Regulating the body processes (d) All of these
2. The main function of protein is
(a) Energy giving (b) Body building
(c) Maintaining body temperature (d) Controlling heart beat
3. The quality protein is the protein of
(a) Rice (b) Soybean (c) Egg (d) meat
4. Fruits and vegetables are the main source of
(a) Protein (b) Energy
(c) Vitamins and minerals (d) Carbohydrate
5. The traditional food preservation methods are
(a) Drying (b) Fermentation (c) Pickling (d) All of these
6. Nutritional anemia is caused by the deficiency of
(a) Iron (b) Iodine (c) Thiamin (d) Vitamin C
7. Which one is the cause of vitamin A deficiency
(a) Night blindness (b) Xerosis (c) Bitot spot (d) All of these

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8. The main source of carbohydrate is
(a) Cereals (b) Legumes and pulse
(c) Fruits and vegetables (d) Meat and meat Product
9. Which one of the following is taken as a trace element.
(a) Calcium (b) Potassium (c) iodine (d) Sodium
10. Which food may be carcinogenic?
(a) Grilled meat (b) Boiled meat
(c) Fried meat (d) Pressure cooked meat

Best of Luck