

Set :- A

Name of the Student:

Enrolment No:

[12th]

PMT

Time :- 2 Hours

General Instructions

Full Marks :- 225

- 1 This question booklet contains 75 questions. Divided into three sections Section A, Section B and Section C.
- 2 Each section contains 25 multiple choice questions as well as multiple choice question. Choose the most appropriate option.
- 3 Each question carries 3 marks, for each correct answer the student will be awarded 3 marks, zero if not attempted and -1 in all other cases.
- 4 The OMR will be graded by machine so do not fold or make any stray marks on the OMR sheet.
- 5 The bubbles on the OMR sheet should be filled completely with black ball pen. Do not hard press the pen on the OMR sheet.
- 6 Fill the required details in the OMR sheet. Incomplete OMR sheets will not be considered for evaluation.

- 1 इस प्रश्न पुस्तिका में 75 प्रश्न शामिल हैं। जो तीन खंडों खंड A, खंड B और खंड C में विभाजित हैं।
- 2 प्रत्येक खंड में 25 प्रश्न शामिल हैं। केवल एक सही विकल्प और एक से अधिक बहुविकल्पीय प्रश्न शामिल हैं। सबसे उपयुक्त विकल्प चुनें।
- 3 प्रत्येक प्रश्न के सही जबाब के लिए 3 अंक मिलेंगे, प्रश्न का हल नहीं करने पर शून्य अंक और गलत विकल्प के लिए -1 अंक मिलेंगे।
- 4 OMR मशीन द्वारा मूल्यांकन किया जाएगा इसलिए OMR शीट पर किसी भी प्रकार का निशान या मोड़ नहीं बनाए।
- 5 OMR शीट पर बने गोले काले बॉल पेन के साथ पूरी तरह से भरा जाना चाहिए। OMR शीट पर कलम से हार्ड प्रेस न करें।
- 6 OMR शीट के दोनो पक्षों में आवश्यक फील्ड भरें। अधूरे OMR शीट का मूल्यांकन नहीं होगा।

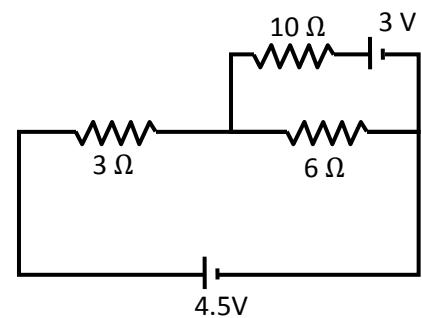
Deposit the Question Booklet and OMR sheet both to the invigilator.

रिजल्ट व अन्य जानकारियाँ OMR शीट में भरे मोबाईल पर SMS से भेजी जाएगी।

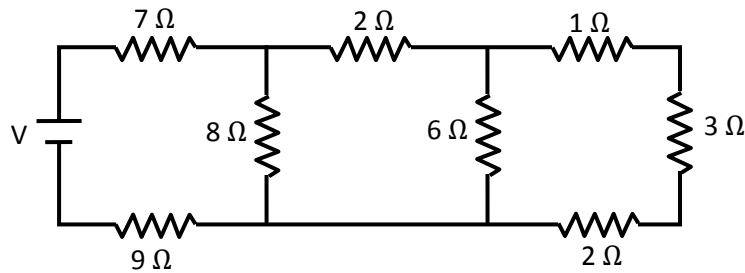
SECTION – A

1. The velocity of projection of a projectile is $(6\hat{i} + 8\hat{j})$ m/sec. the horizontal range of the particle is ($g=10$ m/sec²)
 (a) 4.9 m (b) 9.6 m (c) 19.6 m (d) 14 m
2. A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. if the acceleration of the truck is 5 m/sec², the frictional force acting on the block is
 (a) 5 N (b) 6 N (c) 10 N (d) 15 N
3. The kinetic energy of a body of mass 2 kg and momentum of 2 Ns is
 (a) 1 J (b) 2 J (c) 3 J (d) 4 J
4. Let a_r and a_t , represent radial and tangential accⁿ. the motion a particle may be circular if
 (a) $a_r = 0, a_t = 0$ (b) $a_r = 0, a_t \neq 0$ (c) $a_r \neq 0, a_t = 0$ (d) none of these
5. 2 masses 1 g and 4 g are moving with equal K.E. the ratio of the magnitude of their linear momentum is
 (a) 1 : 1 (b) 1 : 2 (c) 1 : 3 (d) 1 : 4
6. There are particles of same mass. If one of the particles is at rest always and the other has an acceleration \vec{a} . Acceleration of centre of mass is
 (a) zero (b) $1/2 \vec{a}$
 (c) \vec{a} (d) centre of mass for such a system can not be defined
7. The moment of inertia (I) for a uniform circular disc is
 (a) MR^2 (b) $MR^2/4$ (c) $MR^2/2$ (d) $3/2 MR^2$
8. A constant torque acting on a uniform circular what changes its angular momentum from A_0 to $4 A_0$ in 4 sec. the magnitude of this torque is
 (a) $4 A_0$ (b) A_0 (c) $12 A_0$ (d) $3 A_0/4$

9. In absence of external forces on a rigid system, which of the following quantities must remain constant?
 (a) Angular momentum (b) positive vector
 (c) both (a) and (b) (d) none of these
10. The centre of a disc rolling without slipping on a plane moves with a speed v . a particle on the lower half of the rim making an angle 60° with the vertical, will be moving at speed
 (a) zero (b) v (c) $\sqrt{2} v$ (d) $2 v$
11. Frequency of a spring mass system is ν . if it is taken in a lift with constant acceleration upward, then frequency will
 (a) decrease (b) increase (c) remain constant (d) none of these
12. In a SHM, if particle oscillates with frequency ν the the frequency of oscillation. Of its kinetic energy
 (a) ν (b) $\nu/2$ (c) 2ν (d) 4ν
13. Under similar condition of temperature and pressure in which of the following gasses, the velocity of sound will be largest.
 (a) H_2 (b) N_2 (c) He (d) CO_2
14. Let E be the electric field and V_1 the electric potential at a point
 (a) If $E \neq 0$, cannot be 0 (b) If $E = 0$, V must be 0
 (c) if $V = 0$, E must be 0 (d) none of these
15. The force between 2 short electric dipoles separated by a distance r is directly proportional to
 (a) r^2 (b) r^4 (c) r^{-2} (d) r^{-4}
16. Find the current through the 10Ω resistor shown in the figure
 (a) zero
 (b) 1 A
 (c) 2 A
 (d) 5 A



17. In the ladder network shown, current through the resistor 3Ω is 0.25 A . the input voltage V is equal to



- (a) 10 v (b) 20 v (c) 5 v (d) $15/2 \text{ v}$
18. The ammeter shown in the figure consists of a 480Ω coil connected in parallel to a 20Ω shunt. Find the reading of the ammeter
- (a) $50/73 \text{ A}$
 (b) $40/53 \text{ A}$
 (c) $80/93 \text{ A}$
 (d) $73/50 \text{ A}$
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19. A parallel plate condenser is connected to a battery of e.m.f. 4 V . if a plate of electric constant 8 is inserted into it, then the potential difference on the condenser will be
- (a) $1/2 \text{ V}$ (b) 2 V (c) 4 V (d) 32 V
20. The material for making permanent magnets should have
- (a) High retentivity, high coercivity (b) high retentivity, low coercivity
 (c) low retentivity, high coercivity (d) low retentivity, low coercivity
21. A conducting rod of length l rotates with a uniform angular velocity ω about its \perp bisector. A uniform magnetic field β exists parallel to the axis of rotation. The potential difference between the ends of the rod is
- (a) $2\beta\omega l^2$ (b) $\frac{1}{2}\beta\omega l^2$ (c) $\beta\omega l^2$ (d) zero
22. The average power delivered to a series AC circuit is given by (symbols have their usual meaning)
- (a) $E_{rms} I_{rms}$ (b) $E_{rms} I_{rms} \cos \phi$ (c) $E_{rms} I_{rms} \sin \phi$ (d) zero

23. Critical angle of light passing from glass to air is minimum for
 (a) red (b) green (c) yellow (d) violet
24. The critical angle of light going from medium A to medium B is θ . The speed of light in medium A is V . the speed of light in medium B is
 (a) $\frac{V}{\sin \theta}$ (b) $V \sin \theta$ (c) $V \cot \theta$ (d) $V \tan \theta$
25. When a lens of power P (in air) made of material of refractive index μ is immersed in liquid of refractive index μ_0 . Then the power of lens is
 (a) $\frac{\mu-1}{\mu-\mu_0} P$ (b) $\frac{\mu-\mu_0}{\mu-1} P$ (c) $\frac{\mu-\mu_0}{\mu-1} \frac{P}{\mu_0}$ (d) none of these

SECTION – B

1. For the gas phase reaction,

$$\text{PCl}_5 \rightleftharpoons \text{PCl}_3 (\text{g}) + \text{Cl}_2 (\text{g})$$

(a) $\Delta H < 0$ $\Delta S < 0$	(b) $\Delta H > 0$ $\Delta S < 0$
(c) $\Delta H = 0$ $\Delta S < 0$	(d) $\Delta H > 0$ $\Delta S > 0$

2. Oxidation no. of Cr in CrO_5

(a) + 10	(b) + 8	(c) + 6	(d) + 4
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3. The calomel electrode used as reference electrode contains

(a) $\text{PbO}_2 + \text{PbSO}_4$ mixture	(b) HgCl_2
(c) Hg_2Cl_2	(d) ZnCl_2

4. A current of 2 amp when passed for 5 hours through a molten salt. Deposits 22.2 g of metal of atomic mass 177. The oxidation state of metal in the salt is

(a) +1	(b) +2	(c) +3	(d) +4
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5. The equilibrium constant for the reaction

$$\text{CaCO}_3 (\text{s}) \rightleftharpoons \text{CaO} (\text{s}) + \text{CO}_2 (\text{g})$$

(a) $K_c = \frac{1}{[\text{CO}_2]}$	(b) $K_c = [\text{CO}_2]$
(c) $K_c = \frac{[\text{CaO}][\text{CO}_2]}{[\text{CaCO}_3]}$	(d) $K_c = [\text{CaO}][\text{CO}_2]$

6. In an equilibrium reaction, for which $\Delta G^0 = 0$ the equilibrium constant K should be

(a) zero	(b) 10	(c) 1	(d) 2
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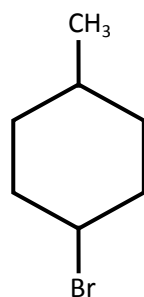
7. Isotonic solution have:

(a) same boiling point	(b) same vapour pressure
(c) same melting point	(d) same osmotic pressure

8. If the absolute temperature of an ideal gas is double and the pressure is reduced to one – half the volume of the gas will

(a) remain unchanged	(b) be double
(c) be halved	(d) increase fourfold

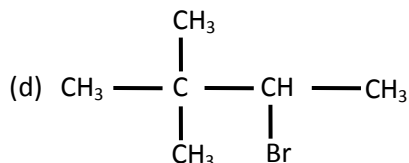
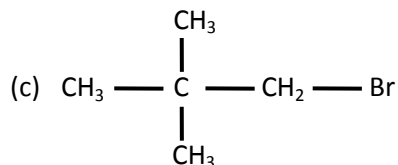
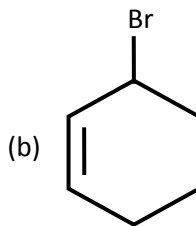
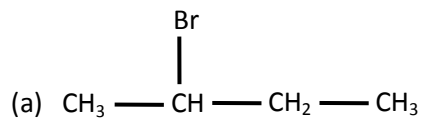
9. Momentum of a photon of wavelength λ is
 (a) $h\lambda/c^2$ (b) h/λ (c) zero (d) $h\lambda/c$
10. The Bohr orbit radius for H-atom ($n = 1$) is approximately 0.53 \AA . The radius for the first excited state ($n = 2$) orbit is
 (a) 0.13 \AA (b) 1.06 \AA (c) 4.77 \AA (d) 2.12 \AA
11. The element ^{232}Th belong to thorium series. Which of the following will act as end product of series?
 (a) $^{208}_{82}\text{Pb}$ (b) $^{209}_{82}\text{Bi}$ (c) $^{206}_{82}\text{Pb}$ (d) $^{207}_{82}\text{Pb}$
12. In the Arrhenius equation $K = A e^{-E_a/RT}$, the Arrhenius constant A will be equal to rate at
 (a) $T = 0$ (b) $T = \infty$ (c) $E_a = RT$ (d) $E_a = \infty$
13. Molecular mass of a tribasic acid is M. its equivalent mass is
 (a) $M/3$ (b) $3M$ (c) $M/9$ (d) $9M$
14. How many geometrical isomer one possible for given compound



- (a) 0 (b) 2 (c) 3 (d) 4

15. $\xrightarrow[\Delta]{\text{H}^+}$ Products obtained are
 (a) Racemic (b) Diastereomers (c) G.I. (d) Positional isomer

16. Which of the following is inert towards E_2 reaction



17. Oxidation state of N in N_2O_5

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

18. No. of P – O – P bonds in P_4O_{10}

- (a) 4 (b) 10 (c) 6 (d) 3

19. Ligands are

- (a) Lewis acid (b) Lewis base (c) neutral (d) none

20. EAN of a metal carbonyl $\text{M}(\text{CO})_x$ is 36. If atomic no. of metal M is 26. What is the value of x?

- (a) 4 (b) 8 (c) 5 (d) 6

21. Which of the following process(es) occur during the extraction of copper from chalcopyrite

- (a) Froth floatation (b) Roasting
(c) Bessemerisation (d) calcinations

22. Which of the following does not exist or rarely exists?

- (a) Fe^{2+} (b) Mn^{7+} (c) Zn^{2+} (d) Zn^{6+}

23. The element which forms oxides in all oxidation states +I to +IV

- (a) N (b) P (c) As (d) Sb

24. The most powerful oxidizing agent among the following is:

- (a) Fluorine (b) Chlorine (c) Iodine (d) Bromine

25. Which carbocation is most reactive towards E_1 mechanism?

- (a) 3° (b) 2° (c) 1° (d) methyl carbocation

SECTION – C

1. Carrying capacity of a population is determined by its:

(a) population growth rate	(b) birth rate
(c) death rate	(d) limiting resource

2. Ovule is inverted with body fused to funicle micropyle lying close to hilum and facing the placenta it is

(a) hemitropous	(b) orthotropous	(c) anatropous	(d) campylotropous
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3. Which cycle is directly driven by solar radiations

(a) Phosphorus	(b) Carbon	(c) Water	(d) Nitrogen
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4. The cranial capacity of Australopithecus was about 500 cc. it existed in

(a) Miocene	(b) Pliocene	(c) pliestocene	(d) both (b) and (c)
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5. In a given RNA segment AUG, ACC, UGG, ACC, CCA, UCA, if the first base gets mutated the effect of this on coding by this RNA segment will result in

(a) a change of first amino acid only	(b) a complete change in the types as well as the sequence of all most all amino acids	(c) no change in the sequence of amino acids	(d) one amino acid less in protein chain
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6. The boundry/transition between two or more communities sharply defined is called :

(a) epilimnion	(b) biome	(c) anticline	(d) ecotone
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7. In detritus food chain transfer of food is

(a) detrite (dead organic matter) → detrivores → decomposers	(b) detrite → microbes → detrivores → decomposers	(c) detrivores → organic matter → microbes → decomposers	(d) grass → detrivores → decomposers
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8. Criss cross inheritance mease:

(a) X chromosome from male will pass to a male of next generation	(b) X chromosome from a male will pass to a female of next generation	(c) X chromosome from female will pass to female of next generation	(d) none of the above
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9. Which is the correct sequence of code transfer involved in the formation of polypeptide
 (a) DNA – t-RNA – r-RNA – m-RNA (b) t-RNA – DNA – m-RNA – r-RNA
 (c) m-RNA – t-RNA – DNA – amino acid (d) DNA – m-RNA – t-RNA – amino acid
10. Correct sequence among the following is
 (a) palaeozoic → Mesozoic → Coenozoic (b) Mesozoic → Archaeozoic → Proterozoic
 (c) Palaeozoic → Archaeozoic → Coenozoic (d) Archaeozoic → palaeozoic → proterozoic
11. In situ conservation of genetic diversity is done in the form of
 (a) national parks (b) biosphere reserves (c) wildlife sanctuaries (d) all of the above
12. A normal man (XY) marries a colourblind women (X^cX^c). The progeny shall be
 (a) 50 % colourblind and 50 % normal sons
 (b) normal daughters and colourblind sons
 (c) carrier normal daughters and colourblind sons
 (d) all daughter and sons are colourblind
13. In polluted water, index of pollution is
 (a) MPN (b) BOD (c) daphnia (d) all of these
14. Leydig cells of mammalian teats are also called
 (a) gland cells (b) goblet cells (c) interstitial cells (d) archaocytes
15. Which one of the following features is found in chordates but in non-chordates
 (a) Gills (b) Spiracles
 (c) Post anal tail (d) Chitinous exoskeleton
16. When a potted plant was cut few inches above soil, then water oozed out of the cut part. It was due to
 (a) transpiration (b) root pressure
 (c) capillary (d) none of above.
17. Path of water movement from soil to xylem is :
 (a) metaxylem → protoxylem → cortex → soil → root hair
 (b) cortex → root hair → endodermis → pericycle → protoxylem → metaxylem
 (c) soil → root hair → cortex → endodermis → pericycle → protoxylem → metaxylem
 (d) pericycle → soil → root hair → cortex → endodermis → protoxylem → metaxylem.

18. Active transport of elements across the cell membrane requires
 (a) ATP (b) acetyl choline (c) phloroglucinol (d) cyclic AMP.
19. Total amount of water present in the soil is called
 (a) chresard (b) holard (c) echard (d) none of the above.
20. In soil, the water available for root absorption is
 (a) gravitational water (b) capillary water
 (c) hygroscopic water (d) combined water
21. The plasmalemma and the tonoplast is an osmotic system which function as
 (a) semipermeable and selectively permeable membrane
 (b) impermeable membranes
 (c) permeable membranes
 (d) unit membranes
22. Wilting of plant occurs when occurs when
 (a) xylem is blocked (b) phloem is blocked
 (c) pith is removed (d) epidermis and few roots are removed.
23. Water absorption in roots mainly takes place in which zone of root?
 (a) zone of elongation (b) root hair zone
 (c) root epidermis (d) maturation zone.
24. In Hydra, the undigested waste material and nitrogenous waste material is removed from
 (a) mouth and body wall (b) mouth and tentacles
 (c) mouth and nematocyst (d) body wall and tentacles
25. Flatworms excrete through
 (a) kidney (b) nephridia (c) protonephridia (d) Malpighian tubules