

Class –T.Y.B.Sc
Semester-VI
Paper-II –Algebra
Sample Questions

1	If R is a ring without zero divisors then _____ hold in R		
a	Cancellation Law	b	Closure Law
c	Associative Law	d	Identity Law
2	A ring R has no zero divisors if there exists $ab \in R$ and		
a	$ab = 0 \Rightarrow a = 0$ (or) $b \neq 0$	b	$ab = 0 \Rightarrow a \neq 0$ (or) $b = 0$
c	$ab = 0 \Rightarrow a = 0$ (or) $b = 0$	d	$ab = 0 \Rightarrow a \neq 0$ (or) $b \neq 0$
2	A ring R has no zero divisors if there exists $ab \in R$ and		
a	$ab = 0 \Rightarrow a = 0$ (or) $b \neq 0$	b	$ab = 0 \Rightarrow a \neq 0$ (or) $b = 0$
c	$ab = 0 \Rightarrow a = 0$ (or) $b = 0$	d	$ab = 0 \Rightarrow a \neq 0$ (or) $b \neq 0$
3	If $a \neq 0$ is an idempotent element of an integral domain with unity then $a =$		
a	0	b	1
c	2	d	3
4	If characteristic of a ring $R = 2$ and $a, b \in R$ commute then $(a-b)^2 =$		
a	$a^2 + b^2$	b	$a^2 - b^2$
c	$\frac{a^2}{b^2}$	d	$a^2 b^2$
5	The set Q of rational numbers is		
a	subring	b	ideal
c	not subring	d	not ideal, for the ring of real numbers
6	Homomorphic image of an integral domain is		
a	A ring	b	Integral domain
c	Field	d	None of the above
7	If R is a non-zero ring so that $a^2 = a \forall a \in R$ then characteristic of R =		
a	0	b	1
c	2	d	3

8	If the characteristic of a ring is 2 and $a, b \in R$ then $(a+b)^2 =$		
a	$a^2 + 2ab + b^2$	b	$a^2 + ab + ba + b^2$
c	$a^2 + b^2$	d	None of these
9	If p is prime, the ring of integers modulo p is		
a	Field	b	Integral domain
c	Skew field	d	None of these
10	$Z_6 = \{0,1,2,3,4,5\}$ is the ring of integers modulo 6 and $U = \{0,3\}$ is an ideal of Z_6 . Then coset $2+U =$		
a	$\{0,3\}$	b	$\{2,5\}$
c	$\{0,1,2,3,4,5\}$	d	$\{0,1,2,3,4\}$
11	For the homomorphism $f: R \rightarrow R$ defined by $f(x) = x \ \forall x \in R$ $\ker f$ is		
a	R	b	$\{0\}$
c	Proper set R	d	$\{1\}$
12	Let R be a commutative ring with unity and $a \in R$, then $U = \{ra r \in R\}$ is		
a	Left ideal only	b	Ideal only
c	Prime ideal	d	Smallest ideal containing 'a'
13	If $f(x) = a_0 + a_1x + \dots + a_mx^m$, $a_m \neq 0$ and $g(x) = b_0 + b_1x + \dots + b_nx^n$, $b_n \neq 0$ then $\deg \{f(x)g(x)\}$ is		
a	$< m+n$	b	$m+n$
c	$> m+n$	d	mn
14	$M = \left\{ \begin{bmatrix} a & 0 \\ b & 0 \end{bmatrix} / a, b \in Z \right\}$ for the ring R of 2×2 matrices over Z , M is		
a	Ideal	b	Left ideal
c	Right ideal	d	Subring
15	In the ring Z of integers the ideal generated by 7 is		
a	Prime ideal	b	Maximal ideal
c	Not maximal	d	None of these
16	In the ring Z_6 , the associates of 2 are		
a	1,5	b	0,2
c	2,4	d	0,2,4

17	If M is a maximal ideal in R then the number of ideals in the quotient ring $\frac{R}{M}$ is (Here R is a commutative ring with unity)		
a	0	b	1
c	2	d	3
18	The set of all 2×2 matrices over real numbers under matrix addition and multiplication is		
a	A commutative ring	b	A field
c	An integral domain	d	A non – commutative ring with unity
19	The number of ideals in the ring $(\mathbb{Z}_{17}, \oplus, \odot)$ is		
a	1	b	2
c	8	d	16
20	For what prime p , $25x^5 - 9x^4 + 3x^2 - 12 \in \mathbb{Z}[x]$ is irreducible over \mathbb{Q}		
a	3	b	13
c	5	d	2