ARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : Transform & Discrete Mathematics (18HS0832)

Course & Branch : B.Tech CE

Year &Sem : II-B.Tech& I-Sem **Regulation : R18**

UNIT-I

TRANSFORM CALCULUS-I

1. a) Find theLaplace transform of $e^{at}\cosh bt$ [2 M]
   b) Find the Laplace transform of $3\cos 3t.\cos 4t$ [2M]
   c) Find $L^{-1}\left\{\frac{2s-5}{4s^2+25}\right\}$by using linear property. [2 M]
   d) Find $L\{t^2+3t+10\}$ [2M]
   e) State Convolution theorem. [2M]
2. a) Find the Laplace transform of $e^{-3t}\left(2\cos 5t-3\sin 5t\right)$ [5M]
   b) Find the Laplace transform of $f(t)=\int_0^t e^{-t}\cos t\,dt$. [5M]
3. a) Find the Laplace transform of $f(t)=\frac{1-\cos at}{t}$ [5 M]
   b) Show that $\int_0^\infty t^2 e^{-4t}.\sin 2t\,dt=\frac{11}{500}$,Using Laplace transform [5 M]
4. a)Find Laplace Transform of Square-wave function of periodic 2a, defined as $f(t)=\begin{cases} k, & 0<t<a \\ -k, & a<t<2a \end{cases}$ [5 M]
   b) Using Laplace transform, evaluate $\int_0^\infty \frac{\cos at-\cos bt}{t}dt$. [5 M]
5. a) Find the Laplace transform of $f(t)=e^{-4t}\int_0^t \frac{\sin 3t}{t}dt$. [5 M]
   b) Find the Laplace transform of $f(t)=t\ e^{2t}\sin 3t$ [5 M]
6. a) Find $L^{-1}\left\{\frac{3s-2}{s^2-4s+20}\right\}$ by using first shifting theorem [5M]
   b) Find $L^{-1}\left\{\frac{1}{2}\log\left(\frac{s^2+a^2}{s^2+b^2}\right)\right\}$ [5M]
7. a) Find $L^{-1}\left\{\frac{1}{\left(s^2+5^2\right)^2}\right\}$, using Convolution theorem. [5 M]

b) Find $L^{-1}\left\{\dfrac{s^2}{\left(s^2+\ 4\right)\left(s^2+25\right)}\right\}$,using Convolution theorem. [5M]

8. a) Find the Inverse Laplace transform of $\dfrac{1}{s^2\left(s^2+a^2\right)}$. [5 M]

b)Find $L^{-1}\left\{\log\left(\dfrac{s-1}{s+1}\right)\right\}$ [5 M]

9. Use transform method to solve $(D^2+5D+6)y=5e^t$ where $y(0)=2, y^1(0)=1$ [10M]

10. Solve the D.E $\dfrac{d^2y}{dt^2}+2\dfrac{dy}{dt}+2y=5\sin t$ using Laplace Transform given that $y(0)=0, y^1(0)=0$ [10M]

UNIT II

Fourier Transforms

1. a) Find the Fourier sine transform of $e^{-|x|}$ Hence show that $\int_0^\infty \frac{x \sin mx}{1+x^2} dx = \frac{\pi}{2} e^{-m}, m > 0$.
   b) Find the Fourier cosine transform of $2e^{-5x} + 5e^{-2x}$.
2. Find the Fourier transform of $f(x) = \begin{cases} a^2 - x^2 |x| < a \\ 0 \qquad |x| > a > 0 \end{cases}$
   Hence show that $\int_0^\infty \frac{\sin x - x \cos x}{x^3} dx = \frac{\pi}{4}$.
3. a) Find the Fourier transform of $f(x) = e^{\frac{-x^2}{2}}, -\infty < x < \infty$
   b) If $\mathrm{F}(p)$ is the complex Fourier transform of $\mathrm{f}(x)$, then prove that the complex fourier transform of $\mathrm{f}(x) \cos xa$ is $\frac{1}{2}[F_s(p+a) + F_s(P-a)]$.
4. a) Find the Fourier cosine transform of $e^{-ax} \cos ax, a > 0$.
   b) Find the Fourier cosine transform of $f(x) = \begin{cases} x & for\ 0 < x < 1 \\ 2 - x & for\ 1 < x < 2. \\ 0 & for\ x > 2 \end{cases}$
5. Find the Fourier sine and cosine transforms of $f(x) = \frac{e^{-ax}}{x}$ and deduce that
$$\int_0^\infty \frac{e^{-ax} - e^{-bx}}{x} \sin sx\, dx = \tan^{-1}\left(\frac{s}{a}\right) - \tan^{-1}\left(\frac{s}{b}\right).$$
6. Find the Fourier sine and cosine transforms of $f(x) = e^{-ax}, a > 0$
   and hence deduce the integrals $(i) \int_0^\infty \frac{p \sin px}{a^2+p^2} dp$ $(ii) \int_0^\infty \frac{\cos px}{a^2+p^2} dp$
7. Find the Inverse Fourier sine transform of $f(x)$ of $F_s(p) = \frac{p}{1+p^2}$.
8. a) Find the finite Fourier sine transform of $f(x)$=$\begin{cases} x, & 0 \le x \le \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} \le x \le \pi \end{cases}$.
   b) Find the inverse finite Fourier sine transform of $f(x)$, if $F_s(n)$=$\frac{16(-1)^{n-1}}{n^3}$, where n is a positive integer and $0 < x < 8$.
9. a)Find the Finite cosine transform of $f(x) = e^{ax} in\ (0, l)$.
   b) Find the Inverse Fourier cosine transform $f(x)$ if $F_c(n) = \frac{\cos\left(\frac{2n\pi}{3}\right)}{(2n+1)^2}$ where $0 < x < 4$.
10. a) Write the Inversse Fourier Transform.
    b) Show that $F_s\{xf(x)\} = -\frac{d}{ds}\{F_c(s)\}$.
    c) Write the formula for Finite Fourier cosine transform.
    d) Find the Inverse Fourier sine transform f(x) if $F_s(n) = \frac{1-\cos n\pi}{n^2\pi^2} 0 < x < \pi$.
    e) Find the Fourier transform of $f(x)$ defined by $f(x) = \begin{cases} 0 & -\infty < x < \alpha \\ x & \alpha < x < \beta \\ 0 & x > \beta \end{cases}$

UNIT-III

ALGEBRAIC STRUCTURES

1. Define group and an abelian group. Prove that the set Z of all integers with the binary operation *, defined as $a*b = a+b+1, \forall a,b \in Z$ is an abelian group.
2. a)Define and give an examples for group, semi group, subgroup &abelian group.

   b)Let s={a,b,c} and let *denotes a binary operation on 's' is given below also let p={1,2,3}and addition be a binary operation on 'p' is given below. show that (s,*) & (p,(+)) are isomorphism

*	A	B	C
A	A	B	C
B	B	B	C
C	C	B	C

(+)	1	2	3
1	1	2	1
2	1	2	2
3	1	2	3

3. a)Show that the set={1,2,3,4,5} is not a group under addition & multiplication modulo 6

   b) On the set Q of all rational number operation * is defined by a*b=a+b-ab.

   Show that this operation Q forms a commutative monoid.

4. a) Explain the concepts of homomorphism and isomorphism of groups with examples.

   b) Let$(G,*)$ and (H,Δ) be a groups and $g: G \to H$ be a homomorphism. The the kernerl of g is a normal subgroup.

5 a)The necessary and sufficient condition for a non-empty sub-set H of a Group (G,*) to be a sub group is aϵH,bϵH=>a*b⁻¹ЄH

   b) Show that every homomorphic image of an abelian group is abelian.

6. a) Show that the set of all roots of the equation $x^4 = 1$ forms a group under multiplication.

   b) Showthat the set of all rational numbers forms an abelian group under the composition defined by

   $a * b = \frac{ab}{2}$

7. a) In a group G for a,bϵG,o(a)=5, b≠e and $aba^{-1}=b^2$. Show that o(b)=31.

b) Let $s = \{a, b\}$ be a set consider all possible permutations of S as $s_2 = \{P_1, P_2\}$ Show that $(s_2,*)$is a permutation group.

8. a) Let $Z_5^* = \{[1],[2],[3],[4]\}$ in which [1], [2], ….. have the same meaning as in Z_5 except that $Z_5^* = Z_5 - \{[0]\}$. Also let X_5 is multiplication modulo 5. Show that $g: Z_4 \to Z_5^*$ is given by $g([0]) = [1], g([1]) = [2], g([2]) = [4], g([3]) = [3]$ defines a homomorphism from the group $(Z_4, +_4) to (Z_5^*,*_4)$.Hence show that g is group isomorphic.

b) Show that if a, b are arbitrary elements of a group G then $(ab)^2=a^2b^2$ iff G is abelian.

9. a) Prove that the order of a subgroup of a finite group divides the order of the group ?

b) Prove that the kernel of a homomorphism from (G , *) to (H , Δ) is a subgroup of (G , *) .

10.(a) Define Monoid , Semi group?

(b) Let $(Z_4 +_4) G = \{1, -1, i, -i\}$ be a multiplicative group. Find the order of every element.

(c) Define isomorphism of a group?

(d) Define Normal group?

(e) Define Homomorphism of a semi group?

UNIT IV

Introduction to counting

1. (a)In how many ways can a committee of 5 teachers and 4 students be chosen from 9 teachers and 15 students with at least 2 students in each committee ?

   (b) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where

   (i) each $x_i \geq 2$? (ii) each $x_i > 2$?

2. (a) How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no Repetitionsare allowed?

   (b) Find the generating function for the sequence 1,1,1,3,1,1,…………

3. (a) The question paper of mathematics contains two questions divided into two groups of 5 questions each. In how many ways can an examine answer six questions taking at least two questions from each group.

   (b) How many permutations can be formed out of the letters of word " SUNDAY" ? How many of these (i) Begin with S? (ii) end with Y? (iii) begin with S & end with Y ? (iv) S &Y always together ?

4. (a) In how many ways can the letters of the word COMPUTER be arranged? How many of them begin with C and end with R? How many of them do not begin with C but end with R?

   (b) out of 9 girls and 15 boys how many different committees can be formed each consisting of 6 boys and 4 girls?

5. a) Determine the number of positive integer $1 \leq n \leq 100$ and is not divisible by 2 , 3 , or 5

   b) Solve $a_n = a_{n-1} + 2a_{n-2}, n \geq 2$ with initial conditions $a_0 = 0, a_1 = 1$

6. a) Solve $a_n = 3a_{n-1} - 3a_{n-2} + a_{n-3}$ with initial conditions $a_0 = 0, a_3 = 3, a_5 = 10$

   b) A survey among 100 students shows that of the three ice cream flavors vanilla, chocolate, strawberry 50 students like vanilla, 43 like chocolate, 28 like straw berry, 13 like vanilla and chocolate, 11 like chocolate and straw berry, 12 like straw berry and vanilla and 5 like all of them. Find the following.

7. (a) Find how many integers between 1 and 60 that are divisible by 2 nor by 3 and nor by 5. Also determine the number of integers divisible by 5 not by 2, not by 3.

   b) out of 80 students in a class , 60 play football, 53 play hockey , and 35 both the games . how many students (i) do not play of these games . (ii) play only hockey but not football.

8. a) Applying pigeon hole principle show that of any 14 integers are selected from the set $S = \{1,2,3,\ldots\ldots,25\}$ there are at least two whose seem is 26. Also write a statement that generalizes this result.

   b) Show that if 8 people are in a room, at least two of them have birthdays that occur on the same day of the week

9. a) Determine the sequence generated by

   $f(x) = 2e^x + 3x^2$ (ii) $7e^{8x} - 4e^{3x}$.

   b) Solve the RR $a_{n+2} - 2a_{n+1} + a_n = 2^n$ with initial condition $a_0 = 2$ & $a_1 = 1$.

10. (a) State Pigeon?

    (b) State Multinomial theorem?

    (c) Define permutation & Combination?

    (d) State Generating Function?

    (e) State Inclusion and Exclusion?

UNIT-5
Introduction to Graphs

1. a) Define isomorphism. Explain Isomorphism of graphs with a suitable example.

b) Explain graph coloring and chromatic number give an example.

2. a)Explain about complete graph and planar graph with an example

b) Define the following graph with one suitable example for each graphs

(i) spanning tree (ii) sub graph (iii) induced sub graph (iv) spanning sub graph

3. a) Explain In degree and out degree of graph. Also explain about the adjacency matrix representation of graphs. Illustrate with an example?

b) Give an example of a graph that has neither an Eulerian circuit nor a Hamiltonian circuit

4. a) Show that the maximum number of edges in a simple graph with n vertices is n (n-1) / 2

b) A graph G has 21 edges, 3 vertices of degree4 and the other vertices are of degree 3. Find the number of vertices in G?

5. a) Suppose a graph has vertices of degree 0 , 2, 2, 3 and 9 . How many edges does the graph have ?

b) Give an example of a graph which is Hamiltonian but not Eulerian and vice versa .

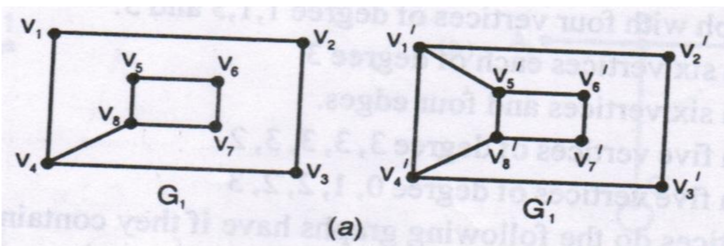
6. a) Let G be a 4 – Regular connected planar graph having 16 edges. Find the number of regions of G .

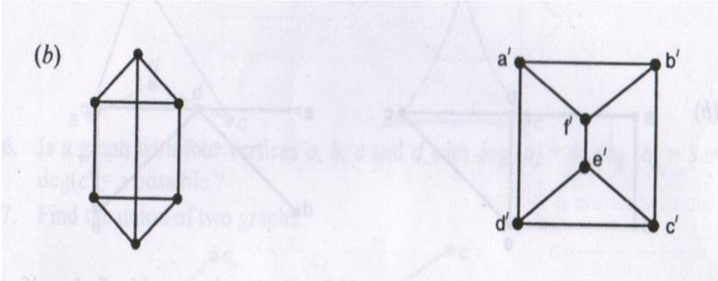
b) Draw the graph represented by given Adjacency matrix

(i) $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 2 & 0 & 3 & 0 \\ 0 & 3 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$ (ii) $\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$

7. a) Show that in any graph the number of odd degree vertices is even .

b) Is the following pairs of graphs are isomorphic or not ?





8. a) Show that the two graphs shown below are isomorphic ?

b) Explain about the Rooted tree with an example ?

9. a) (i)Find the chromatic polynomial & chromatic number for $K_{3,3}$

(ii) Define Euler circuit, Hamilton cycle ,Wheel graph ?

b) Explain any 5 graphs with examples.

10. a) Define regular graph.

a)State handshaking theorem.

b) Define Complete bipartite graph.

c) State Euler's formula.

d)Determine the number of edges in cycle graph C_n

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QUESTION BANK (OBJECTIVE)

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Year &Sem : II-B.Tech& I-Sem **Regulation : R18**

TRANSFORM CALCULUS-I

1. $L\{e^{-at}\} =$ [ ]

A) $\frac{1}{s^2+a^2}$ B) $\frac{a}{s^2+a^2}$ C) $\frac{1}{s+a}$ D) $\frac{1}{s-a}$

2. $L\{Cosat\} =$ [ ]

A) $\frac{s}{s^2+a^2}$ B) $\frac{a}{s^2+a^2}$ C) $\frac{1}{s+a}$ D) $\frac{1}{s-a}$

3. $L\{2\} =$ [ ]

A) $\frac{1}{s}$ B) $\frac{2}{s}$ C) $\frac{1}{s^2}$ D) 1

4. $L\{Coshat\} =$ [ ]

A) $\frac{s}{s^2-a^2}$ B) $\frac{a}{s^2+a^2}$ C) $\frac{1}{s+a}$ D) $\frac{s}{s^2+a^2}$

5. $L\{e^{at}\sin bt\} =$ [ ]

A) $\frac{s}{(s-a)^2+b^2}$ B) $\frac{s}{(s-a)^2-b^2}$ C) $\frac{b}{(s-a)^2+b^2}$ D) $\frac{b}{(s-a)^2-b^2}$

6. If $L\{f(t)\} = \bar{f}(s)$ then $L\{e^{-at} f(t)\} =$ [ ]

A) $\overline{f}(s+a)$ B) $\overline{f}(s-a)$ C) $\overline{f}(as)$ D) $(s+a)$

7. The Laplace transform of $f(t)$ is defined as [ ]

A) $\int_0^\infty e^{-st} f(t)dt$ B) $\int_0^\infty e^{-st} \bar{f}(s)dt$ C) $\int_0^\infty e^{st} f(t)dt$ D) None

8. If $L^{-1}\left\{\frac{1}{s-2}\right\} =$ [ ]

A) $\frac{e^{-at}}{s}$ B) $\frac{3e^{-at}}{2}$ C) e^{2t} D) $\frac{e^{-2s}}{2}$

9. $L\{\sinh at\} =$ [ ]

A) $\frac{s}{s^2-a^2}$ B) $\frac{a}{s^2+a^2}$ C) $\frac{1}{s+a}$ D) $\frac{a}{s^2-a^2}$

10. Find the value of $L^{-\prime}\left\{\frac{s^2+3s+7}{s^3}\right\} =$ ____________. [ ]

A) $1-3t-\frac{7}{2}t^2$ B) $1+3t+\frac{7}{2}t^2$ C) $1-3t-7t^2$ D) None

11. $L\{k\} =$ [ ]

A) $\frac{k}{s}$ B) $\frac{1}{s}$ C) $\frac{1}{s^2}$ D) k

12. The value of $L^{-1}\left\{\frac{1}{s}\right\} =$ [ ]

(A) 1 B) 0 C) -1 D)None

13. $L\{e^{at}\} =$ [ ]

A) $\frac{1}{s^2+a^2}$ B) $\frac{a}{s^2+a^2}$ C) $\frac{1}{s+a}$ D) $\frac{1}{s-a}$

14. $L\{e^{at}t^2\} =$ [ ]

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

15. $L\{e^{at}\cos at\} =$ [ ]

A) $\frac{s-a}{(s-a)^2+b^2}$ B) $\frac{s-b}{(s-a)^2-b^2}$ C) $\frac{b}{(s-a)^2+b^2}$ D) $\frac{b}{(s-a)^2-b^2}$

16. If $L\{f(t)\} = \bar{f}(s)$, then $L\left\{\frac{f(t)}{t}\right\} =$ [ ]

A) $\int_s^\infty \bar{f}(s)ds$ B) $\int_{-\infty}^\infty \bar{f}(s)ds$ C) $\int_{-\infty}^\infty \bar{f}(t)ds$ D) $\int_0^\infty \bar{f}(s)ds$

17. If $L\{f(t)\} = \bar{f}(s)$,then $L\{e^{at}f(t)\}$ ____________. [ ]

A) $\bar{f}(s)$ B) $\bar{f}(s-a)$ C) $\bar{f}(s+a)$ D) None

18. If $L^{-1}\left\{\frac{4}{s-3}\right\} =$ [ ]

A) $\frac{e^{-at}}{s}$ B) $\frac{3e^{-at}}{s}$ C) $4e^{3t}$ D) $\frac{e^{-as}}{s}$

19. The value of $L^{-1}\left\{\frac{1}{(S+a)^5}\right\}$ is [ ]

A) $e^{-at}\frac{t^4}{24}$ B) $e^{at}t^4$ C) $e^{at}\frac{t^4}{24}$ D) $e^{-at}t^4$

20. If $L\{f(t)\} = \bar{f}(s)$,then $L\{f(at)\}$ ____________. [ ]

A) $a\bar{f}(s)$ B) $\frac{1}{a}\bar{f}\left(\frac{s}{a}\right)$ C) $\bar{f}\left(\frac{s}{a}\right)$ D) None

21. $L\{\cosh 3t\} =$ [ ]

A) $\frac{s}{s^2+3^2}$ B) $\frac{a}{s^2-3^2}$ C) $\frac{1}{s^2+3^2}$ D) $\frac{s}{s^2-3^2}$

22. Find $L\{e^t \sin t\}$=________________. [ ]

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

23. Find the value of $L\{t^3+6\}$=____________. [ ]

A) $\frac{3}{s^2}+\frac{6}{s}$ B) $\frac{6}{s^4}+\frac{6}{s}$ C) $\frac{3}{s^2}-\frac{6}{s}$ D) None

24. If $L^{-1}\left\{\frac{s}{s^2-2^2}\right\}=$ [ ]

(A) $\frac{1}{2}\sinh 2t$ B) $\frac{1}{2}\cos 2t$ C) $\sin 2t$ D) $\cosh 2t$

25. Find the value of $L^{-\prime}\left\{\frac{1}{(s-a)^5}\right\}=$ ____________. [ ]

A) $e^{at}t^4$ B) $e^{at}t^4/4$ C) $e^{at}\frac{t^4}{4!}$ D) $\frac{t^4}{4!}$

26. If $L^{-\prime}\{\overline{f}(s)\}=f(t)$ then $L^{-1}\{\overline{f}(s+a)\}=$ ______________ [ ]

A) $e^{-at}f(t)$ B) $e^{at}f(t)$ C) e^{at} D) None

27. If $L^{-1}\left\{\frac{1}{s^2+a^2}\right\}=$ [ ]

(A) $\frac{1}{a}\sin at$ B) $\frac{1}{a}\cos at$ C) $\sin at$ D) $\cos at$

28. Find the value of $L^{-\prime}\left\{\frac{1}{s^2-5s+6}\right\}=$ ___________ [ ]

A) $e^{-3t}-e^{-2t}$ B) $e^{3t}+e^{-2t}$ C) $e^{3t}-e^{2t}$ D) None

29. $L\{c_1 f_1(t)+c_2 f_2(t)\}=c_1L\{f_1(t)\}+c_2L\{f_{21}(t)\}$ This property in respect of Laplace transforms Is called [ ]

A) Shifting property B) Distributive property C) Symmetric property D) Linearity property

30. $L\{1\}=$ [ ]

A) $\frac{1}{s}$ B) $\frac{2}{s}$ C) $\frac{1}{s^2}$ D) 1

31. $L\left\{\frac{1}{\sqrt{t}}\right\}=$ [ ]

A) $\sqrt{\frac{\pi}{s}}$ B) $\sqrt{\frac{1}{s}}$ C) $\sqrt{\frac{2\pi}{s}}$ D) $\sqrt{\frac{s}{\pi}}$

32. If $L^{-1}\left\{\frac{s}{s^2+a^2}\right\}=$ [ ]

(A) $\frac{1}{a}\sin at$ B) $\frac{1}{a}\cos at$ C) $\sin at$ D) $\cos at$

33. If $L^{-1}\left\{\frac{1}{2s-5}\right\}=$ [ ]

(A) $\frac{1}{2}e^{\frac{5t}{2}}$ B) $-\frac{1}{2}e^{\frac{5t}{2}}$ C) $e^{\frac{5t}{2}}$ D) $\frac{1}{2}e^{\frac{2t}{5}}$

34. If $L^{-1}\left\{\frac{1}{s^n}\right\}$ is a possible only when n is [ ]

A) Positive integer B) Zero C) Negative integer D) All of these

35. If $L^{-\prime}\{\overline{f}(s)\}=f(t)$ and then $L^{-1}\left\{\int_s^{\infty} f(\overline{s})ds\right\}=$ [ ]

A) tf(t) B) $\frac{f(t)}{t}$ C) $e^{at}f(t)$ D) None

36. If $L^{-1}\{\overline{f}(s)\}=f(t)$ and $f(0)=0$, then $L^{-1}\{s\,\overline{f}(s)\}=$ [ ]

A) $f''(t)$ B) $f(s)$ C) $f'(t)$ D) $f^1(s)$

37. $L\{5-3t-2e^{-t}\}=$ [ ]

A) $\frac{3s^2+2s-3}{s^2}$ B) $\frac{3s^2+2s-3}{s^2(s+1)}$ C) $\frac{3s^2+2s-3}{s^2(s-1)}$ D) $\frac{3s^2+2s+3}{s^2}$

38. $L\{t^3\}=$ [ ]

A) $\frac{6}{s}$ B) $\frac{6}{s^3}$ C) $\frac{6}{s^2}$ D) $\frac{6}{s^4}$

39. If $L^{-1}\{\overline{f}(s)\}=f(t)$ and $f(0)=0$, then $L^{-1}\{s\overline{f}(s)\}=$ [ ]

(A) $f(t)$ B) $\frac{f(t)}{t}$ C) $\frac{f^1(s)}{s}$ D) $f^1(t)$

40. If $L^{-1}\{\overline{f}(s)\}=f(t)$ and $L^{-1}\{\overline{g}(s)\}=g(t)$, then $L^{-1}\{\overline{f}(s).\,\overline{g}(s)\}=$ [ ]

(A) $f(t)*g(t)$ B) $f(s)*g(s)$ C) $\frac{f(t)}{g(t)}$ D) None

UNIT - II

1. The Fourier transform of a function $f(x)$ is [ ]

A) $\int_0^{\infty} f(x)e^{ipx}dx$ B) $\int_{-\infty}^{\infty} f(x)e^{ipx}dx$ C) $\int_0^{\infty} f(x)e^{-ipx}dx$ D) None

2.If F{f(x)} and G{g(x)} be the Fourier transforms of f(x) and g(x) then F{a f(x)+b g(x)}=-----
Where a and b are constants [ ]

A) a F{ f(x)}+b F{g(x)} B) (a+b) F{f(x)+g(x)} C) b F{ f(x)}+a F{g(x)} D) None

3. The finite fourier sine transform of f(x)= x in $(0,\pi)$ is ____________ [ ]

A) $\frac{\pi}{n}(-1)^{n+1}$ B) $\pi(-1)^{n+1}$ C) $\frac{\pi}{n}(-1)^{n}$ D) None

4. If F{f(x)}=f(p) then the inversion formula is ------------------ [ ]

A) $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(p)e^{-ipx}dp$ B) $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(p)e^{ipx}dp$ C) $\frac{2}{\pi}\int_{-\infty}^{\infty} f(p)e^{-ipx}dp$ D) None

5. $F_s\{e^{-at}\}$ =------ [ ]

A)$\frac{p}{(a^2+p^2)^2}$ B) $\frac{p}{a^2+p^2}$ C) $\frac{a}{a^2+p^2}$ D) None

6. If $F(p)$ is the Fourier transform of $f(x)$ then $F\{f(x-a)\}=$ [ ]

A) $e^{ipa}F(p)$ B) $e^{-ipa}F(p)$ C) $e^{pa}F(p)$ D) $e^{-pa}F(p)$

7. Finite Fourier cosine transform of f(t)=1, 0<t<1 is [ ]

A)$\frac{\sin n\pi}{n\pi}$ B)$\frac{\cos n\pi}{n\pi}$ C)$\sin n\pi$ D)$\cos n\pi$

8 . If $F\{f(x)\}=F(p)$ then $F\{f(ax)\}=$ [ ]

A) $aF\left(\frac{p}{a}\right)$ B) $\frac{1}{a}F\left(\frac{a}{p}\right)$ C) $aF\left(\frac{a}{p}\right)$ D) $\frac{1}{a}F\left(\frac{p}{a}\right)$

9. Find $F_s\{2e^{-5x}\}=$ --------- [ ]

A) $\frac{2p}{p^2+5^2}$ B) $\frac{5p}{p^2+2^2}$ C) $\frac{p}{p^2+5^2}$ D) None

10. Fourier cosine transforms of e^{-2x} is [ ]

A) $\frac{p}{p^2+2^2}$ B) $\frac{2}{p^2+2^2}$ C) $\frac{-2p}{p^2+2^2}$ D) $\frac{2p}{p^2+2^2}$

11. Fourier sine transform of f(x) =$\frac{1}{x}$ is ---- [ ]

A) $\frac{\pi}{2}$ B)π C)0 D) None

12. For the function applying Fourier transform it has to satisfy ----------condition [ ]

A) dirichlet B)euler C)parseval D) $\frac{1}{z-1}$

13. If F{f(x)}=f(p) then F[f(x/a)]= ---------------- [ ]

A)a f(ap) B) 1/a f(p/a) C) a f(p/a) D) None

14.Fourier cosine transform of f(x)=e^{-x} is ______ [ ]

A) $\frac{1}{1+p^2}$ B) $\frac{1}{1-p^2}$ C) $\frac{1}{p^2}$ D) None

15. Fourier cosine transform of f(x)=X is [ ]

A) 0 B)1 C)-1/p^2 D) None

16.Find $F_C\left(f'(x)\right) =$ ______________ [ ]

A)-f(0)+$F_C(P)$ B) -f(0)+ $pF_s(P)$ C)$F_C(P)$ D)None

17. The fourier cosine transform of f(x)=$\frac{e^{-ax}}{x}$ is _______ [ ]

A)$\frac{1}{2}\log(P^2+a^2)$ B)$-\frac{1}{2}\log(P^2+a^2)$ C)$\frac{1}{2}\log(P^2-a^2)$ D)None

18. The fourier sine transform of 2e^{-5x}+5e^{-2x} is [ ]

A)$\frac{2P}{P^2+25}+\frac{5P}{P^2+4}$ B)$\frac{2P}{P^2-25}+\frac{5P}{P^2-4}$ C)$\frac{10}{P^2+25}+\frac{10}{P^2+4}$ D)None

19. $F_S\{xf(x)\}$=___________________ [ ]

A) $-\frac{d}{dp}[F_c(p)]$ B)$\frac{d}{dp}[F_s(p)]$ C)f(0) D)None

20. Find f(x) if its Fourier sine transform is e^{-ap}. [ ]

A)$\frac{2P}{\pi(a^2+p^2)}$ B)$\frac{2P}{\pi(a^2-p^2)}$ C)$\frac{2}{\pi}$ D)None

21. Fourier cosine transforms of xe^{-ax} [ ]

A)$\frac{a^2-p^2}{(a^2+p^2)^2}$ B)$\frac{a^2+p^2}{(a^2+p^2)^2}$ C)$\sqrt{2\pi}$ D)None

22. If$F_C\{f(ax)\}$=k$F_C\left(\frac{p}{a}\right)$ then k =_______ [ ]

A) a B) $\frac{1}{a}$ C)a^2 D)None

23. The Fourier cosine transform of f(x)=$\begin{cases} k, if\ 0<x<a \\ 0, if\ x>a \end{cases}$ [ ]

A)$\frac{K\sin ap}{p}$ B)$\frac{k\cos ap}{p}$ C)0 D)1

24. The Fourier sine transform of $\frac{e^{-ax}}{x}$ is [ ]

A)$\tan^{-1}\frac{a}{P}$ B)$\tan^{-1}\frac{P}{a}$ C)$\tan^{-1}a$ D)$\tan^{-1}P$

25. Find$F_c\{xf(x)\}$=___________________ [ ]

A) -$\frac{d}{dp}[F_c(p)]$ B)$\frac{d}{dp}[F_s(p)]$ C)f(0) D)None

26. The Finite Fourier sine transform of $f(x)=\frac{x}{\pi}, in\ \ 0<x<\pi$ is [ ]

A) $(-1)^{n+1}/_2$ B) $(-1)^{n-1}/_2$ C) (-1) D)$(-1)^{n+1}\frac{1}{n}$

27. The Finite Fourier sine transform of $f(x)=1, in\ \ 0<x<\pi$ is [ ]

A) $\frac{1-(-1)^{n+1}/_2}{n}$ B) $\frac{1-(-1)^2}{n}$ C) (-1) D)$\frac{1-(-1)^n}{n}$

28. The Finite Fourier cosine transform of $f(x)=1, in\ \ (0,\pi)$ is $F_c(n)=$ [ ]

A) $\frac{16[(-1)^n+1]}{(n\pi)^2}$ B) π C) $\frac{[(-1)^n-1]}{(n\pi)^2}$ D)0

29. The Fourier sine transform of a function $f(x)$ is $F_s(P)=$ [ ]

A)$\int_0^\infty f(x)\sin px\,dx$ B) $\int_0^\infty f(x)\sin px\,dp$

C) $\int_0^\infty F(P)\,e^{ipx}dx$ D) $None$

30. The finite Fourier cosine transform of $2x$ in$(0,2\pi)$ is [ ]

A) $\frac{(-1)^n}{n}$ B) $\frac{1-(-1)^2}{n}$ C) $\frac{[(-1)^n-1]}{(n\pi)^2}$ D) $\frac{8[(-1)^n-1]}{n^2}$

31. The Finite Fourier cosine transform of $f(x) = x, in\ \ (0,4)$ is $F_c(n) =$ [ ]

A) $\frac{16[(-1)^n+1]}{(n\pi)^2}$ B) $\frac{1-(-1)^2}{n}$ C) $\frac{[(-1)^n-1]}{(n\pi)^2}$ D) $\frac{16[(-1)^n-1]}{(n\pi)^2}$

32. If T is the period of f(x) then the period of f(ax + b) is [ ]

A) T B) T-a C) T/a D) aT

33. F{ f(x)} =F(p) then $F\{f(x)\cos ax\} = \frac{1}{2}[f(p+a)+f(p-a)]$ is [ ]

A) shifting theorem B) linearity property C) modulation theorem D) None

34. The Inverse Fourier sine transform $F_s(P)$ is $f(x) =$ [ ]

A) $\frac{2}{\pi}\int_0^\infty F_s(P)\sin px\,dp$ B) $\int_0^\infty f(x)\sin px\,dp$ C) $\frac{2}{\pi}\int_0^\infty F_c(P)\cos px\,dp$ D) $None$

35. Fouier transform of the convolution of f(x) and g(x) is the product of their fourier Transforms is [ ]

A) Shifting theorem B) linearity property C) convolution theorem D) None

36. The Fourier cosine transform of a function e^{-at} is [ ]

A) $\frac{P}{a^2+P^2}$ B) $\frac{a}{a^2+P^2}$ C) $\frac{-P}{1+P^2}$ D) $None$

37. $F_c(3e^{-3x} + 2e^{-4x})$is [ ]

A) $\frac{2P}{P^2+9} + \frac{5P}{P^2+16}$ B) $\frac{2P}{P^2-9} + \frac{5P}{P^2-16}$ C) $\frac{9}{P^2+9} + \frac{8}{P^2+16}$ D)None

38. $F_s(e^{-2x} + 4e^{-3x})$is [ ]

A) $\frac{P}{P^2+4} + \frac{4P}{P^2+9}$ B) $\frac{2P}{P^2-9} + \frac{5P}{P^2-16}$ C) $\frac{9}{P^2+9} + \frac{8}{P^2+16}$ D)None

39. $\int_0^\infty e^{ax}\cos bx\,dx =$ [ ]

A) $\frac{1}{a^2+b^2}$ B) $\frac{c}{a^2+b^2}$ C) $\frac{b}{a^2+b^2}$ D) $\frac{a}{a^2+b^2}$

40. If $f(x) = \frac{2}{\pi}\int_0^\infty F_c(p)\cos px\,dp$ is called [ ]

A) Inverse cosine transform B) Inverse sine transform

C) Fourier transform D) Fourier cosine transform

UNIT III

ALGEBRAIC STRUCTURES

1. The algebraic system $(S,\circ)$ is called __ is the operation o is associative [ ]

   A) Group B) Monoid C) Semi group D) Abelian group

2. If $(I,+)$ is a Monoid where I is the set of integers and + is the operation of addition

   Then the identity element is [ ]

   A) 1 B) 0 C) -1 D) None

3. Let g be a homomorphism from (X,o) to (Y,*). If $g: X \to Y$ is one-to-one and onto

   then g is called [ ]

   A) Bijection B) Isomorphism C) Epimorphism D) Monomorphism

4. Let S be a nonempty set and $P(S)$ be its power set. The algebras

   $(P(S),\cup)$ and $(P(S),\cap)$ are [ ]

   A) Monoid B) Group C) Abelian group D) all

5. If the operations * is distribution over addition for any a,b,cϵI then a*(b+c)= [ ]

   A)(a*b)*c B)a+(b*c) C)(a*b)+(a*c) D)none

6. By cancellation law for any a,b,cϵI and a$\neq$0 a*b=a*c => [ ]

   A)b=c B)a C)a=c D)c

7. For m=1, f:A→A such an operation is called [ ]

   A)unary operation B) binary operation C)m-nary operation D)none

8. For m=2, f:A→A such an operation is called [ ]

   A)unary operation B) binary operation C)m-nary operation D)none

9. The operation * will be a binary operation on G if and only if ____ ∀ a,bϵG [ ]

   A)aϵG B)bϵG C)a*bϵG D)none

10. The inverse of the identify element is the [ ]

    A)inverse element B) Identity element C)idempotent element D) nilpotent element

11. A group with addition binary operation is known as [ ]

    A)Abelian group B)Groupoid C)subgroup D)additive group

12. A group with multiplication binary operation is known as [ ]

    A)Abelian group B) additive group C) multiplicative group D)none

13. A group G is said to be ____if the commutative law holds [ ]

A)groupoid B)semigroup C)Abelian D)none

14. In order word (s,0) is a semigroup if for any x,y,zϵs then xo(yoz)= [ ]

A)(xoy)*z B)(xoz)oy C)(xoy)oz D)x*(y*z)

15. semigroup isomorphism satisfies [ ]

A)on-to B)one-one C)one-one&on-to D)none

16. semigroupephimorphism satisfies [ ]

A)on-to B)one-one C)one-one&on-to D)none

17. Every homomorphic image of an abelian group is [ ]

A)sub group B)semigroup C)abeliangroup D)none

18. If H is any subgroup of a group G then HH= [ ]

A)H^{-1} B)e C)1 D)H

19. A non-empty subset H of a group (G,*) a subgroup iff__where aϵH,bϵH [ ]

A)abϵH B)a*bϵH C)$a*b^{-1}$ϵH D)$a^{-1}b$ϵH

20. An algebric structure (s,*) which has an identity element and also satisfies closure, associative law is called a [ ]

A)subgroup B)groupoid C)monoid D)none

21. The identity element (if it exists) of any algebraic structure is [ ]

A)multiple B)unique C)one D)zero

22. If a*e=a then e is called____element for the operation [ ]

A)left identity B)Right identity C)identity D)none

23. If e*a=a then e is called____element for the operation [ ]

A)left identity B)Right identity C)identity D)none

24 The nonzero set of integers under multiplication is [ ]

A)monoid B)semigroup C)Group D) all

25. The order of the identity element of a group G is [ ]

A)1 B)2 C)0 D)3

26. The inverse of 4 in the multiplicative group of integers modulo 7 is [ ]

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

27. Associative law is [ ]

A) A B = B A B) A = A C) (AB) C = A (B C) D) B = B

28. The order of 4 in the group of addition modulo 12 is [ ]

A)3 B)7 C)8 D)10

29. The group with commutative is...........group. [ ]

A) an abelian B) symmetric C)alternating D)commutative

30. If G is a group , H is a sub group of G and $a,b \in G$, then the relation $a \equiv b$ (mod H) is [ ]

A)Reflexive B) Symmetric C) reflexive & symmetric D) an equivalence relation

31. The order of alternating group , if the set S has n elements is [ ]

A) n B) n! C) n/2 D) n! /2

32. The order of group of all one- one & onto mappings from S to S there the order of S is n , and is . [ ]

A) n B) n! C) n/2 D) n! /2

33. If G is a group and $a,b \in G$,then $(ab)^{-1}$ = [ ]

A) $a^{-1}b^{-1}$ B) ab^{-1} C) $a^{-1}b$ D) $b^{-1}a^{-1}$

34. The solution of ax= b in a group G , where $a,b \in G$ is [ ]

A) ab^{-1} B) $a^{-1}b^{-1}$ C) $a^{-1}b$ D) a^{-1}

35. If e_1 and e_2 are two identity elements of a group G , then [ ]

A) $e_1 < e_2$ B) $e_1 = e_2$ C) $e_1 > e_2$ D) e_1e_2

36. If G is a finite group of order n , and $a \in G$ then [ ]

A) $e^n = a$ B) $a^n = a$ C) $a^n = e$ D) $a^n \neq e$

37. If the order of an element $a \in G$ is n and the order of a^{-1} is m ,then [ ]

A) m< n B) m > n C) m = n D) m = an

38. The order of 4 in the additive group of integers mod 6 is [ ]

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

39. The inverse of 8 in the multiplicative group of integers mod 11 is [ ]

A)7 B)9 C)5 D)6

40. If G is a group and $a,b \in G$, then [ ]

A) $a^2b = a^2b^2$ B) $(a.b)^2 = a^2.b^2$ C) $a.b = a^2 . b^2$ D) $a.b \neq a^2 b^2$

UNIT IV

1. Enumerating r-permutations without repetitions P(n,r)= [ ]

   A) $\frac{n!}{r!(n-r)!}$ B) $\frac{n!}{r!}$ C) $\frac{n!}{(n-r)!}$ D) None

2. How many 3 digit number can be formed using the digits 1,3,4,5,6,8 and 9 [ ]

   A) 7*6*5 B) 3! C) $\frac{7!}{3!}$ D) 7^3

3. The series $1 + x + x^2 +$ ------------ = [ ]

   A) $\sum x^r$ B) $\sum(-1)x^r$ C) $\sum(-a)^r x^r$ D)none

4. If a student is to answer true or false questions and there are five questions, the number of ways, he can answer is [ ]

   A) 10 B) 16 C) 32 D) 5

5. The number of two-digit words, if repetitions are allowed is [ ]

   A) 576 B) 676 C) 52 D) 650

6. The four-digit numbers, that can be formed from the digits 1,2,3,4,5,6,7 if there will be no repetitions are [ ]

   A) 24 B) 6 C)840 D) 120

7. The three-digit numbers, that can be formed from the digits 1,2,3,4,5 if repetitions are allowed is [ ]

   A)125 B) 120 C) 60 D) 36

8. The number of ways sitting five people around a table is [ ]

   A) 24 B) 120 C) 312 D)720

9. The number of ways of drawing 2 cards with replacement from a deckof 52 cards is [ ]

   A)2704 B) 1326 C) 52 D) 2652

10. The number of ways of drawing 2 cards without replacement from a deck of 52 cards Is [ ]

    A)2704 B) 1326 C) 52 D) 2652

11. There are 12 red balls and 8 blue balls in a box. The number of ways of selecting 5 red balls and 3 blue balls is [ ]

    A) 42126 B)44352 C) 12118 D) 24352

12. The number of positive integer solutions of x+y+z=6 is [ ]

    A) 24 B) 20 C) 10 D)15

13. The three-digit numbers, that can be formed from digits 1,2,3,4,5, if repetitions are not

allowed is [ ]

A) 125 B) 60 C) 45 D) 90

14. The number of non-negative integer solutions of x+y+z=9 is [ ]

A) 55 B) 45 C) 60 D)72

15. The number of positive integer solutions of x+y+z<7 is [ ]

A) 20 B) 60 C) 120 D) 90

16. The number of permutations of the word SUCCESS is [ ]

A) 960 B) 420 C) 120 D) 840

17. The number of permutations of the word HAPPY is [ ]

A) 90 B) 120 C) 60 D) 40

18. The number of permutations of the word LAPTOP is [ ]

A) 240 B) 120 C) 360 D) 40030

19. The number of combinations of five objects among eight objects, if the repetitions are allowed and order is not important is [ ]

A) 645 B) 792 C) 896 D) 962

20. The number of combinations of three objects among six objects, if the repetitions are allowed and order is not important is [ ]

A) 56 B)96 C) 48 D) 120

21. There are two groups; each consists of four questions each. If a student is to answer 2 from one group and 3 from another group, the number of ways that he can answer is [ ]

A) 48 B)24 C)72 D) 30

22. The coefficient of x^5y^2 in the expansion of $(x+2y)^7$ is [ ]

A) 42 B) 84 C) 120 D) 96

23. The coefficient of x^5y in the expansion of $(2x+y)^6$ is [ ]

A) 192 B) 128 C) 120 D) 144

24. |AUB|=62, |A|=32, |B|=42, then |A∩B|= [ ]

A) 24 B) 15 C) 36 D) 12

25. The number of integers<500 and divisible by 3 or 6 or 7 is [ ]

A)214 B) 248 C) 324 D) 194

26. The number of integers<250 and divisible by 7 or 11 is [ ]

A)54 B) 48 C) 74 D) 9

27. The co-efficient of $(x^3+x^4+x^5+\text{---})^5$ is=---- [ ]

A)126 B)127 C)125 D)none

28. The solution of linear recurrence relation is ----methods [ ]

A)4 B)3 C)2 D)none

29. Which method ,the solution is obtained as the sum of two parts---- [ ]
A)substitution B)characteristic root C)step by step D)none

30. When fn= 0,thentheequation is----- [ ]
A)homogeneous B)non-homogeneous C)none

31. If the characteristic equation has 2,1 roots, then the solution is---- [ ]
A)$a_n=b_1 2^n + b_2(-1)^n$ B)$a_n=(b_1+2b_2)(-1)^n$ C)$(2b_1+(-1)b_2)r^n$ D)none

32. The solution of linear non-homogeneous equation is=------ [ ]
a)$a_n=a_n^{(h)}+a_n^{(p)}$ B)$a_n=A_0+A_1n+A_2n^2$ C)Ab^n D)none

33. $\sum a_nx^n$ is equal to----------- [ ]
A)$a_0+a_1x+a_2x^2$+--- B)$a_0x+a_1x^2+a_2x^3$+-- C) $a_0 + a_1 X$ D)none

34. Solving recurrence relation for ----types [ ]
A)2 B)3 C)1 D)none

35. The generating function of 1 is [ ]
A)$\frac{1}{1-x}$ B) $\frac{1}{1+x}$ C) $\frac{1}{1-2x}$ D) $\frac{x}{1-2x}$

36. The generating function of 3^n is [ ]
A)$\frac{x}{1-3x}$ B)$\frac{x}{1+3x}$ C)$\frac{1}{1+x}$ D)$\frac{x}{1-x}$

37. The generating function of n is [ ]
A)$\frac{1}{1+x}$ B)$\frac{1}{1-x}$ **C)$\frac{x}{(1-x)^2}$** D)$\frac{1}{(1-x)^2}$

38. The generating function of 1+n is [ ]
A)$\frac{1}{1-x}$ B)$\frac{1}{1+x}$ C)$\frac{x}{(1-x)^2}$ D)$\frac{1}{(1-x)^2}$

39. The generating function of the sequence 1, -2 , 4 , -8 ,16 ……is [ ]
A)$\frac{x}{1+2x}$ **B)$\frac{1}{1+2x}$** C)$\frac{x}{(1-x)^2}$ D)$\frac{x^2}{(1+2x)^2}$

40. The exponential generating function of the sequence 1,1,1,1…….is [ ]
A) e^x B) e^{-x} C) e^{2x} D)e^{-2x}

UNIT V

GRAPH THEORY

1. A regular graph of degree _____ has no lines. [ ]

A) 0 B) 1 C) 2 D) 3

2. The maximum degree of any vertex in a simple graph with n vertices is [ ]

A) n B) n+1 C) n-1 D) n+2

3. A graph G has 21 edges, 3 vertices of degree 4 and other vertices of degree 3. Find the number of vertices in G. [ ]

A) 10 B) 11 C) 12 D) 13

4. The maximum number of edges in a simple graph with n vertices is [ ]

A) n(n-1)/2 B) (n-1)/2 C) n(n+1)/2 D) n(n1)

5. A graph which allows more than one edge to join a pair of vertices is called [ ]

A) Simple graph B) Multi-graph C) Null graph D) Weighted graph

6. A simple graph G, in which every pair of distinct vertices are adjacent is called [ ]

A) Simple graph B) Multi-graph C) Null graph D)Complete graph

7. A binary tree T has n leaves. The number of nodes of degree 2 in T is [ ]

A) n-1 B) n C) n+1 D) 2n

8. The total number of edges of a complete graph K_n is… [ ]

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

9. A graph without edges is called a ……graph [ ]

A) trivial graph B) null graph C)infinite graph D) simple graph

10. A graph is regular , if the degree of each vertex is ……… [ ]

A) same B) not same C) always zero D) always one

11. A graph G has 21 edges, 3 vertices of degree 4 and other vertices of degree 3. Find the number of vertices in G. [ ]

A) 10 B) 11 C) 12 D) 13

12. The maximum degree of any vertex in a simple graph with n vertices is [ ]

A) n B) n+1 C) n-1 D) n+2

13. Eular's rule is [ ]

A) v+e+r=2 B) v-e+r=2 C) ve-r=2 D) v+er=2

14. A planar graph has only ___ infinite region(s). [ ]

A) one B) two C) Three D) four

15. If a connected planar graph G has e edges, v vertices and r regions, then [ ]

A) v+e+r=2 B) v-e+r=2 C) ver=2 D) v+er=2

16. A connected graph that contains an Euler Circuit is called [ ]

A) Euler trail B) Semi-Euler graph C) Euler graph D) Hamilton graph

17. A complete bipartite graph $K_{m, n}$ is planar if and only if [ ]

A) m>3 or n>3 B) m<3 or n> 3 C) m<=3 or n<=3 D) m>=3 or n>3 b

18. A graph G=(V,E) is called a ___ graph if its vertices V can be partitioned into twosubsets V_1 and V_2such that each edge of G connects a vertex of V1 to a vertex of V2 [ ]

A) simple B) bipartite C) complete bipartite D) multi graph

19. The chromatic number of completebipartite graph is ……. [ ]

A) 1 B) 2 C) 3 D) 0

20. A complete graph with n vertices will have ____ edges [ ]

A) (n-1)(n-2)/2 B) n(n-1)/2 C) (n-2)/2 D) n(n-2)/2

21. A graph which allows more than one edge to join a pair of vertices is called a [ ]

A) simple graph B) null graph C) multi graph D) Pseudo graph

22. If G is a connected graph with n vertices and m edges, a spanning tree of g must have__edges

A) n B) n+1 C) n+3 D) n-1 [ ]

23. A given connected graph is a Eular graph if and only if all vertices of G are of [ ]

A) same degree B) even degree C) odd degree D) Different degree

24. An ____ through a graph is a path whose edge list contains each edge of the graph exactly once.

A) Eular path B) Eular circuit C) Eular graph D) Eular region [ ]

25. An ____ is a graph that possesses a Eular circuit. [ ]

A) Eular path B) Eular circuit C) Eular graph D) Eular region

26. A circuit in a connected graph which includes every vertex of the graph is known as [ ]

A) Eular B) Universal C) Hamiltonian D) Clique

27. If G is agraph within vertices, then a Hamiltonian cycle in G will contain exactly ___ edges

A) n-1 B) n C) n+1 D) n+2 [ ]

28. The length of a Hamiltonian path in a connected graph of n vertices is [ ]

A) n-1 B) n C) n+1 D) n+2

29. A circuit in a connected graph which includes every vertex of the graph is known as

A) Eular B) Universal C) Hamiltonian D) Clique [ ]

30. The number of colors required to properly color the vertices of every planar graph is

A) 2 B) 3 C) 4 D) 5 [ ]

31. The vertices of a planar graph with less than 30 edges is ____ colorable [ ]

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

32. A simple connected planar graph with 17 edges and 10 vertices cannot be ____ colorable

A) 1 B) 2 C) 3 D) 4 [ ]

33. The chromatic number of an isolated vertex is [ ]

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

34. The Chromatic number of a graph having atleast one edge is atleast [ ]

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

35. Every _____ graph is 5colorable [ ]

A) simple B) bipartite C) planar D) Euler