KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI
MATH 152, ANALYSIS
MID-SEMESTER EXAMINATION

Attempt All Questions **Time: 75 Minutes**

1. (a) Find the truth set of $35-2x-x^2<0$.

(b) Prove that $\sqrt{2}$ is irrational.

(c) Given that $A=\left\{\frac{3n+7}{n}\right\}_{n=1}^{\infty}$, find the

(i) lower bound of A.
(ii) greatest lower bound of A.
(iii) upper bound of A.
(iv) least upper bound of A.

(d) Find the cluster point(s) of

$$P=\left\{2+(-1)^n\left(\frac{3n^2-2n+2}{2n^2+4n-1}\right);\quad n=1, 2\ldots\right\}.$$

(e) Find $\lim_{x\to 0}\left(\frac{1-\cos x}{x^2}\right)$.

(f) (i) State Bolzano-Weierstrass theorem.

(ii) Does the set $T=\left\{\frac{1}{2^n}: n=1, 2, 3\ldots\right\}$ satisfy the Bolzano-Weierstrass theorem?

Does the set T have a cluster point? If yes, find it and prove it.

(2) (a) If $U_n=\frac{n+3}{2n+1}$, prove that the sequence $\{U_n\}$ is

(i) bounded
(ii) monotonic

(b) Prove that $\lim_{n\to\infty}\left(\frac{n-1}{3n+2}\right)=\frac{1}{3}$, using the definition of a limit.

(c) Determine whether $f(x)=\dfrac{x^2-3}{x^3+2x}$ is even, odd, or neither.

(d)

Given that $f(x) = \begin{cases} \dfrac{|x-1|}{x-1}, & x \neq 1 \\ 0, & x = 1, \end{cases}$

find $\lim_{x \to 1} f(x)$.

(e) The sum of the first n terms of an Arithmetic Progression (AP) is given by $S_n = n^2 \log_e 3$

(i) Find the n^{th} term of the progression.

(ii) How many of the terms of the progression are less than $12\log_e 27$?

END OF SEMESTER.

MATH 152 2014

1. The smallest natural number is....
   A. 0
   B. 1
   C. 2
   D. $-\infty$

2. The symbol used to represent the set of integers is....
   A. I
   B. R
   C. Q
   D. Z

3. The number $\sqrt{16}$ is which of the following?
   A. Rational
   B. Whole
   C. Integer
   D. Natural

4. The number 0.098709870987... is in which subset?
   A. Natural
   B. Integers
   C. Rational
   D. Irrational

5. Which of the following numbers is a rational number, an integer, a whole number and a natural number?
   A. $\frac{143}{13}$
   B. $\frac{3}{4}$
   C. 0.17
   D. 0

6. Which of the following correctly defines a deleted $\frac{1}{2}$ – neighbourhood of 2?

A. $\left\{x : \frac{3}{2} \le x \le \frac{5}{2}\right\}$

B. $\left\{x : \frac{3}{2} < x < \frac{5}{2}\right\}$

C. $\left\{x : \frac{3}{2} \le x \le \frac{5}{2}, x \neq 2\right\}$

D. $\left\{x : \frac{3}{2} < x < \frac{5}{2}, x \neq 2\right\}$

7. If $A = \left\{\frac{1}{2^n} : n = 0, 1, 2, 3 \ldots\right\}$, find the cluster point of A.

A. 0

B. 1

C. 2

D. ∞

8. How many cluster points does the set $(-1, 2)$ have?

A. 0

B. 1

C. 2

D. Infinitely many

9. Find $\lim_{n \to \infty} \sqrt{\frac{n^2(n-1)}{1 + \frac{1}{2}n^3}}$

A. $\sqrt{2}$

B. 1

C. $\sqrt{\frac{1}{2}}$

D. $\sqrt{\frac{1}{3}}$

10. Find $\lim_{n \to \infty} \left(5^{\frac{n^2}{n^2+1}} \right)$

A. 0
B. 1
C. 2
D. ∞

11. Which of the following is **not** true?

A. There are functions which are neither even nor odd.
B. Every function $f(x)$ may be expressed as the sum of an even and an odd function.
C. An even function is symmetrical about the x-axis.
D. An odd function has a rotational symmetry of order 2 about the origin.

12. Find the sum of the series $\frac{3}{2} + 3 + \frac{9}{2} + \ldots + \frac{27}{2}$

A. 67.5
B. 66.5
C. 65.5
D. 64.5

Given that $A = \{x : |x - 3| < 5\}$.

Use this information to answer Questions 13 and 16.

13. Find the lower bound of A.

A. 2
B. 1
C. 0
D. -4

14. Find the upper bound of A.

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

15. Find the greatest lower bound of A.

A. -3
B. -2
C. -1
D. 0.

16. Find the least upper bound of A.

A. 11
B. 10
C. 9
D. 8

17. The set $T = \{1, 2, 3, 4, 5\}$ has no cluster point.

A. True
B. False

18. Find the cluster point(s) of $1, \frac{1}{2}, 1, \frac{1}{3}, 1, \frac{1}{4}, 1, \frac{1}{5}, \ldots$

A. 0
B. 1
C. 0 and 1
D. ∞

19. If $T = \left\{\frac{1}{5^n} : n = 0, 1, 2, 3\ldots\right\}$, then T is closed.

A. True
B. False

20. Find the limit point(s) of $a_n = 1 + (-1)^n + \frac{1}{n}$

A. 0
B. 1
C. 2
D. 0 and 2

21. Given that

$$f(x) = \begin{cases} \dfrac{x^2 - x - 2}{x^2 - 3x + 2} & \text{if } x \neq 2 \\ 3 & \text{if } x = 2 \end{cases}$$

Is the function f continuous at $x = 2$? If not, why?

A. f is continuous at $x = 2$
B. $f(2)$ is not defined
C. $f(2)$ is defined but $\lim_{x \to 2} f(x)$ does not exist
D. $f(2)$ is defined and $\lim_{x \to 2} f(x)$ exists but these two numbers are not equal.

22. Given that $f(x)=\begin{cases}|x+2| & \text{if } x\neq -1\\ -1 & \text{if } x=-1\end{cases}$

Is the function f continuous at $x=-1$? If not, why?

A. f is continuous at $x=-1$

B. $f(-1)$ is not defined

C. $f(-1)$ is defined but $\lim_{x\to -1} f(x)$ does not exist

D. $f(-1)$ is defined and $\lim_{x\to -1} f(x)$ exists but these two numbers are not equal.

23. Given that $f(x)=\begin{cases}2|x| & \text{if } x\geq -2\\ 2x & \text{if } x<-2\end{cases}$

Is the function f continuous at $x=-2$? If not, why?

A. f is continuous at $x=-2$.

B. $f(-2)$ is not defined

C. $f(-2)$ is defined but $\lim_{x\to -2} f(x)$ does not exist

D. $f(-2)$ is defined and $\lim_{x\to -2} f(x)$ exists but these two numbers are not equal.

24. The sum of the 4^{th} and 12^{th} terms of an Arithmetic Progression is 20. Find the sum of the first 15 terms of the progression.

A. 120

B. 140

C. 150

D. 170

25. Find $\lim_{x\to 1}\left\{\dfrac{\sqrt{3x+1}-\sqrt{2x+2}}{x-1}\right\}$.

A. 0

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{3}{2}$

26. Consider the function

$$g(x)=\begin{cases} a+bx & \text{if } x>2 \\ 3 & \text{if } x=2 \\ 5-ax^2 & \text{if } x<2 \end{cases}$$

Determine the values of the constants a and b so that $\lim_{x\to 2} g(x)$ exists and is equal to $g(2)$.

A. $a=\frac{-1}{3}$ and $b=\frac{5}{3}$

B. $a=\frac{1}{3}$ and $b=\frac{5}{3}$

C. $a=\frac{-1}{3}$ and $b=\frac{-5}{3}$

D. $a=\frac{-1}{3}$ and $b=\frac{-3}{5}$

27. Find $\lim_{x\to 0}\left(\frac{x\cos x}{\sin x}\right)$.

A. 0

B. $\frac{1}{2}$

C. 1

D. 2

Given that

$$h(x)=\begin{cases} (x-1)^2 & \text{if } x\le 3 \\ 6-kx & \text{if } x>3 \end{cases}$$

where k is a real number.

Use this information to answer Question 28 to 30.

28. Find $\lim_{x\to 3^-} h(x)$.

A. -3

B. -4

C. 3

D. 4

29. Find $\lim_{x\to 3^+} h(x)$.

A. $6-3k$

B. $6+3k$

C. $3k-6$

D. 4

30. Compute

A. $\frac{2}{3}$

B. $\frac{3}{2}$

C. $\frac{3}{5}$

D. $\frac{5}{3}$

31. Determin

$f(x)=x^3$

A. 0.786

B. 0.786

C. 0.786

D. -0.78

32. Suppose

$f'(x)\le$

A. 88

B. 89

C. 90

D. 91

33. The sum

find the

A. $\frac{-3}{2}$

B. $\frac{-2}{3}$

C. $\frac{-1}{3}$

D. $\frac{2}{3}$

30. Compute the value of k for which $\lim_{x \to 3} h(x)$ exist.

A. $\frac{2}{3}$

B. $\frac{3}{2}$

C. $\frac{3}{5}$

D. $\frac{5}{3}$

31. Determine all the numbers which satisfy the conditions of the first Mean Value Theorem for $f(x) = x^3 + 2x^2 - x$ on $[-1, 2]$.

A. 0.7863 or -2.1196

B. 0.7863

C. 0.7863 or -1.1196

D. -0.7863

32. Suppose that $f(x)$ is continuous and differentiable in $[6, 15]$ and given that $f(6) = -2$ and $f'(x) \leq 10$, find the largest possible value of $f(15)$?

A. 88

B. 89

C. 90

D. 91

33. The sum to infinity of a geometric sequence is $\frac{9}{2}$. If the second term of the sequence is -2, find the common ratio of the sequence.

A. $\frac{-3}{2}$

B. $\frac{-2}{3}$

C. $\frac{-1}{3}$

D. $\frac{2}{3}$

34. $f(x) = \dfrac{x^2 - 3}{x^3 + 2x}$ is ...

A. an even function
B. an odd function
C. neither even nor odd

35. $f(x) = 2x^3 - 3x^2 - 4x + 4$ is ....

A. an even function
B. an odd function
C. neither even nor odd

36. Solve $x^2 + 4x + 3 < 0$.

A. $x \le -3$ or $x \ge -1$
B. $x < -3$ or $x > -1$
C. $-3 \le x \le -1$
D. $-3 < x < -1$

Let $\{U_n\}$ and $\{V_n\}$ be two sequences such that $\lim_{n\to\infty} U_n = A$ and $\lim_{n\to\infty} V_n = B$, then

$$\lim_{n\to\infty}\left(\frac{U_n}{V_n}\right) = \frac{\lim_{n\to\infty} U_n}{\lim_{n\to\infty} V_n} = \frac{A}{B} \text{ provided that } \lim_{n\to\infty} V_n \neq 0.$$

Use this information to answer Questions 37 and 38.

37. If $B = 0$ and $A \neq 0$, then $\lim_{n\to\infty}\left(\dfrac{U_n}{V_n}\right)$ does not exist.

A. True
B. False

38. If $B = 0$ and $A = 0$, then $\lim_{n\to\infty}\left(\dfrac{U_n}{V_n}\right)$ may or may not exist.

A. True
B. False

39. Which of the following is not true?

A. $\sin^2 x + \cos^2 x = 1$
B. $1 + \tan^2 x = \sec^2 x$
C. $1 + \cot^2 x = -\operatorname{cosec}^2 x$
D. $\tan(x - y) = \dfrac{\tan x - \tan y}{1 + \tan x \tan y}$

40. $\tanh x =$

A. $\dfrac{e^x - e^{-x}}{e^x + e^{-x}}$
B. $\dfrac{2}{e^x - e^{-x}}$
C. $\dfrac{2}{e^x + e^{-x}}$
D. $\dfrac{e^x + e^{-x}}{e^x - e^{-x}}$

41. Rolle's Theorem states that:

A. If a function $f(x)$ is continuous in an open interval $[a, b]$, and if $f(a) = f(b) = 0$, then $f'(\xi) = 0$.
B. If a function $f(x)$ is continuous in a clos interval (a, b), and if $f(a) = f(b) = 0$, ther $f'(\xi) = 0$.
C. If a function $f(x)$ is continuous in a clo interval $[a, b]$, and if $f(a) = f(b) = 0$, th $f'(\xi) = 0$.
D. If a function $f(x)$ is continuous in an interval (a, b), and if $f(a) = f(b) = 0$ that $f'(\xi) = 0$.

34. $f(x)=\dfrac{x^2-3}{x^3+2x}$ is ...

A. an even function
B. an odd function
C. neither even nor odd

35. $f(x)=2x^3-3x^2-4x+4$ is ....

A. an even function
B. an odd function
C. neither even nor odd

36. Solve $x^2+4x+3<0$.

A. $x\le -3$ or $x\ge -1$
B. $x<-3$ or $x>-1$
C. $-3\le x\le -1$
D. $-3<x<-1$

Let $\{U_n\}$ and $\{V_n\}$ be two sequences such that $\lim_{n\to\infty} U_n = A$ and $\lim_{n\to\infty} V_n = B$, then

$$\lim_{n\to\infty}\left(\frac{U_n}{V_n}\right)=\frac{\lim_{n\to\infty} U_n}{\lim_{n\to\infty} V_n}=\frac{A}{B}$$ provided that $\lim_{n\to\infty} V_n \neq 0$.

Use this information to answer Questions 37 and 38.

37. If $B=0$ and $A\neq 0$, then $\lim_{n\to\infty}\left(\dfrac{U_n}{V_n}\right)$ does not exist.

A. True
B. False

38. If $B=0$ and $A=0$, then $\lim_{n\to\infty}\left(\dfrac{U_n}{V_n}\right)$ may or may not exist.

A. True
B. False

39. Which of the following is not true?

A. $\sin^2 x + \cos^2 x = 1$

B. $1 + \tan^2 x = \sec^2 x$

C. $1 + \cot^2 x = -\cos ec^2 x$

D. $\tan(x - y) = \dfrac{\tan x - \tan y}{1 + \tan x \tan y}$

40. $\tanh x =$

A. $\dfrac{e^x - e^{-x}}{e^x + e^{-x}}$

B. $\dfrac{2}{e^x - e^{-x}}$

C. $\dfrac{2}{e^x + e^{-x}}$

D. $\dfrac{e^x + e^{-x}}{e^x - e^{-x}}$.

41. Rolle's Theorem states that:

A. If a function $f(x)$ is continuous in an open interval (a, b) and differentiable in a closed interval $[a, b]$, and if $f(a) = f(b) = 0$, then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = 0$.

B. If a function $f(x)$ is continuous in a closed interval $[a, b]$ and differentiable in an open interval (a, b), and if $f(a) = f(b) = 0$, then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = 0$.

C. If a function $f(x)$ is continuous in a closed interval $[a, b]$ and differentiable in a closed interval $[a, b]$, and if $f(a) = f(b) = 0$, then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = 0$.

D. If a function $f(x)$ is continuous in an open interval (a, b) and differentiable in an open interval (a, b), and if $f(a) = f(b) = 0$, then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = 0$.

42. The First Mean-Value Theorem states that:

A. If $f(x)$ is continuous in the interval (a, b) and differentiable in $[a, b]$ then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = \dfrac{f(b) - f(a)}{b - a}$.

B. If $f(x)$ is continuous in the interval $[a, b]$ and differentiable in (a, b) then $\forall\ x = \xi \in (a, b)$, $f'(\xi) = \dfrac{f(b) - f(a)}{b - a}$.

C. If $f(x)$ is continuous in the interval (a, b) and differentiable in (a, b) then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = \dfrac{f(b) - f(a)}{b - a}$.

D. If $f(x)$ is continuous in the interval $[a, b]$ and differentiable in (a, b) then $\exists$ at least one value of $x = \xi \in (a, b)$ such that $f'(\xi) = \dfrac{f(b) - f(a)}{b - a}$.

43. Find $\int \dfrac{(2x+1)dx}{2x^2+2x+7}$.

A. $\frac{1}{2}\ln|2x^2+2x+7|+C$

B. $2\ln|2x^2+2x+7|+C$

C. $\ln|2x^2+2x+7|+C$

D. $2\frac{1}{2}\ln|2x^2+2x+7|+C$

44. Find $\int \cot x dx$

A. $\ln|\cos x|+c$

B. $\ln|\cos ecx|+c$

C. $\ln|\sin x|+c$

D. $\ln|\tan x|+c$

45. Find $\int \frac{1}{x^2-3}dx$.

A. $\frac{1}{6}\ln\left|\frac{x-3}{x+3}\right|+c$

B. $\frac{1}{\sqrt{3}}\ln\left|\frac{x-\sqrt{3}}{x+\sqrt{3}}\right|+c$

C. $\frac{1}{2\sqrt{3}}\ln\left|\frac{x-\sqrt{3}}{x+\sqrt{3}}\right|+c$

B. $\frac{1}{2\sqrt{3}}\ln\left|\frac{x-2\sqrt{3}}{x+2\sqrt{3}}\right|+c$

46. Find $\int x^5 \ln x dx$.

A. $\frac{x^5}{6}\ln x+\frac{x^6}{36}+c$

B. $\frac{x^5}{6}\ln x-\frac{x^6}{36}+c$

C. $\frac{x^6}{6}\ln x+\frac{x^6}{36}+c$.

D. $\frac{x^6}{6}\ln x-\frac{x^6}{36}+c$

47. Examine the behaviour of $\sum_{n=0}^{\infty}\frac{n}{n^2+3}$ by using the divergence test.

A. Converges

B. Diverges

48. Examine the behaviour of $\sum_{n=1}^{\infty}\frac{5n^3+2n+3}{16n^2-5n+4}$ by using the polynomial test.

A. Converges

B. Diverges

49. $\sum_{n=0}^{\infty}(-x)^n$ is the Taylor series for....

A. $\sin x$

B. $\cos x$

C. $\frac{1}{1-x}$

D. $\frac{1}{1+x}$

50. Which of the following is the Taylor series for $\sin x$?

A. $\sum_{n=1}^{\infty}\frac{(-1)^n x^{2n-1}}{(2n-1)!}$

B. $\sum_{n=0}^{\infty}\frac{(-1)^{n+1} x^{2n+1}}{(2n-1)!}$

C. $\sum_{n=0}^{\infty}\frac{(-1)^n x^{2n+1}}{(2n+1)!}$

D. $\sum_{n=1}^{\infty}\frac{(-1)^n x^{2n+1}}{(2n+1)!}$

SECTION B

ATTEMPT ONLY ONE QUESTION *(20 MARKS)*

1. (a) Prove that $\sqrt{2}$ is an irrational number.

   (b) (i) State Bolzano-Weierstrass theorem.

   (ii) Does the set $P = \left\{ \frac{1}{2^n} : n = 1, 2, 3 \ldots \right\}$

   (α) satisfy the Bolzano-Weierstrass theorem?

   (β) have a cluster point? If yes, find it and prove it.

   (c) Prove that $\lim_{n \to \infty} \left(\frac{n+3}{3n+2} \right) = \frac{1}{3}$, using the definition of a limit.

   (d) Show that $\left\{ \frac{n}{n+1} \right\}_{n=1}^{\infty}$ is a monotonic increasing sequence.

   (e) Three numbers are in arithmetic sequence. Their sum is 27 and their product is 704. Find the three numbers.

   (f) Given that $f(x) = 2x^3 - 3x^2 + 4x + 4$, construct an:

   (i) even function

   (ii) odd function

   from $f(x)$.

2. (a) (i) State the ratio test for convergence.

   (ii) Investigate the convergence or divergence of the following series:

   (α) $\sum_{n=1}^{\infty} \frac{n^n}{n!}$

   (β) $\sum_{n=1}^{\infty} \frac{2^n n! n!}{(2n)!}$

   (b) (i) State the Cauchy's root test for convergence.

   (ii) Discuss the convergence or divergence of the following series:

   (λ) $\sum_{n=1}^{\infty} \left(\frac{3n}{n+3} \right)^n$

   (μ) $\sum_{n=1}^{\infty} \frac{e^n}{n^n}$

   (c) Show that the p-series $\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} + \ldots$, converges for $p > 1$ and diverges for $0 < p \leq 1$.

   (d) Show that $f(x) = x^2$ is differentiable at $x = 2$.

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30. $\int (x^2+1)^2 dx =$

(a) $\frac{(x^2+1)^3}{3} + c$

(b) $\frac{(x^2+1)^4}{6x} + c$

(c) $(\frac{x^3}{3} + x)^2 + c$

(d) $\frac{7x(x^2+1)^4}{3} + c$

(e) $\frac{(x^5)}{5} + \frac{2x^3}{3} + x + c$

31. Which of the following is equal to $\int_0^{\frac{\pi}{2}} \sin x dx$ =?

(a) $\int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx$

(b) $\int_0 \cos x dx$

(c) $\int_{-}^{0} \sin x dx$

(d) $\int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \sin x dx$

(e) $\int^{2} \sin x dx$

32. If $\int_1^4 f(x)dx \doteq 6$, what is the value of $\int_1^4 f(5-x)dx$

(a) 6

(b) 3

(c) 0

(d) -1

(e) -6

33. $\int_1^2 (4x^3 - 6x)dx$

(a) 2

(b) 4

(c) 6

(d) 36

(e) 42

34. If $\int_1^2 f(x-c)dx = 5$ where c is a constant, then $\int_{1-c}^{2-c} f(x)dx =$

(a) $5+c$

(b) 5

(c) $5-c$

(d) $c-5$

(e) -5

35. If $\int_a^b f(x)dx = a+2b$, then $\int_a^b (f(x)+5)dx =$

(a) $a+2b+5$

(b) $5b-5a$

(c) $7b-4a$

(d) $7b-5a$

(e) $7b-6a$

36. Test the convergence of $\sum_{n=1}^{\infty} \frac{1}{n^{0.99}}$

(a) Convergent

(b) Cannot be predicted

(c) Divergent

(d) Convergent by comparison test

(e) None of these

37. Suppose that a, b, c are in A.P and a^2, b^2, c^2 are in G.P. If $a < b < c$ and $a+b+c = \frac{3}{2}$, then the value of a is:

(a) $\frac{1}{2\sqrt{2}}$

(b) $\frac{1}{2\sqrt{3}}$

(c) $\frac{1}{2} - \frac{1}{\sqrt{2}}$

(d) $\frac{1}{2} - \frac{1}{\sqrt{3}}$

(e) None of these

38. The Taylor series for $\sin x$ about $x = 0$ is $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots$. If f is a function such that $f''(x) = \sin(x^2)$, then the coefficient of x^7 in the Taylor series for $f(x)$ about $x = 0$ is:

(a) $\frac{1}{7!}$
(b) $\frac{1}{7}$
(c) 0
(d) $-\frac{1}{42}$
(e) $-\frac{1}{7!}$

39. Which of the following is false about the $p-$ series

(a) Converges when $p > 1$
(b) Always takes the form $\sum_{n=1}^{\infty} \frac{1}{n^p}$
(c) Diverges when $p < 1$
(d) Converges when $p = 4$
(e) None of the answers

40. Which of the following is true about the series $\sum_{n=1}^{\infty} \frac{1}{(4n-1)(4n-3)}$
I.Divergent series
II. Sum of series is $\frac{1}{12}$
III. Convergent
IV. Sum does not exist.

(a) I only
(b) I and IV only
(c) II and III only
(d) I,II,III and IV
(e) None of the answers

41. $\sum_{n=0}^{\infty} (\frac{1}{3})^{i} =$

(a) $\frac{3}{2} - (\frac{1}{3})^n$
(b) $\frac{2}{3}[1 - (\frac{1}{3})^n]$
(c) $\frac{3}{2}(\frac{1}{3})^n$
(d) $\frac{2}{3}(\frac{1}{3})^n$
(e) $\frac{2}{3}(\frac{1}{3})^{n+1}$

42. Which of the following is true about the series $\sum_{n=1}^{\infty} \frac{x^n}{n^2 \cdot 3^n}$

(a) It is convergent for $-3 < x \leq 3$
(b) It is convergent for $-3 \leq x < 3$
(c) It is convergent for $|x| < 3$ and $x = 3.3$
(d) It is convergent for $-2 \leq x \leq 2$
(e) Nonexistent

43. Which of the following series converges?
I. $\sum_{n=1}^{\infty} \frac{1}{n^3}$ II. $\sum_{n=1}^{\infty} \frac{1}{n}$ III. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

(a) I only
(b) II only
(c) I and II only
(d) I and III only
(e) I, II and III

44. The following is true of the sequence $a_n = (-1)^n$ except

(a) a_n does not approach any number
(b) $\lim_{n\to\infty}(-1)^n$ does not exist
(c) The series diverges
(d) The series is a convegent series
(e) The series has terms which oscillate between 1 and -1 infinitely

45. Which of the following is true about the series: $\sum_{n=1}^{\infty} \frac{x^n}{n!}$
I.The series converges in the interval $-1 \leq x \leq 1$
II The series converges uniformly $-1 \leq x \leq 1$
III.The series has radius of convergence 1 and center 0

(a) I only
(b) II only
(c) III only
(d) I and III only
(e) I,II and III

46. Which of the following series converges
I. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{2^n}$
II. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4+2n+2}$
III. $\sum_{n=1}^{\infty} (-1)^n \sin^{-1}(\frac{1}{n})$

(a) I only
(b) I and II only
(c) I and III only
(d) III only
(e) II only

47. Which of the following series is absolutely convergent.

I. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^2+1}$

II. $\sum_{n=2}^{\infty} \frac{(-1)^{n-1}}{n \ln n}$

III. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1} 2^n}{n^2}$

(a) I only
(b) I and II only
(c) II only
(d) I,II and III
(e) None of these

48. Which of the following series converges?

I. $\sum_{n=1}^{\infty} \frac{n}{n+2}$

II. $\sum_{n=1}^{\infty} \frac{\cos(\pi n)}{n}$

III. $\sum_{n=1}^{\infty} \frac{1}{n}$

(a) None
(b) II only
(c) III only
(d) I and II only
(e) I and III only

49. Which of the following series converges?

I. $\sum_{n=1}^{\infty} \frac{1}{(n^2+1)}$

II. $\sum_{n=1}^{\infty} \frac{n+2}{(n+1)\sqrt{n+3}}$

III. $\sum_{n=1}^{\infty} \frac{2n-1}{(3n+2)n^3}$

(a) I only
(b) II only
(c) I and III only
(d) I and II only
(e) I, II and III

50. Which of the following series are convergent?

I. $1 + \frac{1}{2^2} + \frac{1}{3^2} + \ldots + \frac{1}{n^2} + \ldots$

II. $1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n} + \ldots$

III. $1 - \frac{1}{3} + \frac{1}{3^2} + \ldots + \frac{(-1)^{n-1}}{3^{n-1}} + \ldots$

(a) I only
(b) III only
(c) I and III only
(d) II and III only
(e) I, II and III

51. Which of the following is true.

(a) Every bounded, monotonic sequence has a limit point
(b) Every bounded set is convergent
(c) Every bounded, monotonic sequence is convergent
(d) Every bounded sequence is convergent
(e) Every bounded set is closed.

52. If $f(x) = \sum_{n=1}^{\infty} (\sin^2 x)^n$, then $f(1)$ is

(a) 0.369
(b) 0.585
(c) 2.460
(d) 2.426
(e) 3.426

53. Find the value of $\sum_{n=1}^{\infty} (0.5^n - 0.2^n)$

(a) -3.25
(b) ∞
(c) 0.75
(d) 3.25
(e) 0.3

54. Which of the following series is divergent

I. $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$

II. $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

III. $\sum_{n=1}^{\infty} n e^{-n^2}$

(a) I only
(b) II only
(c) I and II only
(d) I and III only
(e) I,II and III

55. Given the series $\sum_{n=1}^{\infty} \frac{n+2}{(n+1)\sqrt{n+3}}$, the series is convegent.

(a) True
(b) False
(c) Cannot be determined

.3. Which of the following sequence converges?

I. $\{\frac{5n}{2n-1}\}$

II. $\frac{e^n}{n}$

III. $\frac{e^n}{1+e^n}$

(a) I only

(b) II only

(c) I and II only

(d) I and III only

(e) I, II and III

57. Given the series $\sum_{n=1}^{\infty} \frac{n^2}{5n^3+4}$

(a) The series converges

(b) $\lim_{n\to\infty} u_n \neq 0$ for some $n \in N$

(c) The series diverges because $\lim_{n\to\infty} \frac{n^2}{5n^3+4} = \infty$

(d) The series $\sum_{n=1}^{\infty} \frac{n^2}{5n^3+4}$ diverges

(e) None of these

58. Which of the following series converges?

I. $\sum_{n=1}^{\infty}(-1)^{n+1}\frac{1}{2n+1}$

II. $\sum_{n=1}^{\infty}\frac{1}{n}(\frac{3}{4})^n$

III. $\sum_{n=2}^{\infty}\frac{1}{n\ln n}$

(a) I only

(b) II only

(c) III only

(d) I and III only

(e) I, II and III

59. What are the values of x for which the series $\sum_{n=1}^{\infty}\frac{(x-2)^n}{n\,3^n}$ converges?

(a) $-3 \leq x \leq 3$

(b) $-3 < x < 3$

(c) $-1 < x \leq 5$

(d) $-1 \leq x \leq 5$

(e) $-1 \leq x < 5$

60. Which of the following is true about the series $\sum_{n=1}^{\infty}(\sqrt{n+1}-\sqrt{n})$

(a) $\lim_{n\to\infty} u_n = 0$

(b) $\lim_{n\to\infty} u_n \neq 0$

(c) The series is divergent

(d) $S_n = \sqrt{n+1} - \sqrt{1}$

(e) None of these

61. If $\lim_{b\to inf}\int_1^b \frac{dx}{x^p}$ is finite, then which of the following must be true?

(a) $\sum_{n=1}^{\infty}\frac{1}{n^p}$ converges

(b) $\sum_{n=1}^{\infty}\frac{1}{n^p}$ diverges

(c) $\sum_{n=1}^{\infty}\frac{1}{n^{p-2}}$ converges

(d) $\sum_{n=1}^{\infty}\frac{1}{n^{p+1}}$ converges

(e) $\sum_{n=1}^{\infty}\frac{1}{n^{p+1}}$ divverges

62. The sum of the series $\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \ldots$ is

(a) $\log_e 2$

(b) $2\log_e 2$

(c) $\log_e \frac{4}{e}$

(d) $\log_e 2 - 1$

(e) None of the answers

63. Which of the following is true about the series $\sum_{n=1}^{\infty}(\frac{3}{n(n+1)} + \frac{1}{2^n})$

(a) The sum of the series is 4

(b) The series does not exist

(c) The series has no limit hence divergent

(d) The series is divergent

(e) Cannot be solved

64. Which of the following series diverges?

I. $\sum_{k=3}^{\infty}\frac{2}{k^2+1}$?

II. $\sum_{k=1}^{\infty}(\frac{6}{7})^k$

III. $\sum_{k=2}^{\infty}\frac{(-1)^k}{k}$

(a) None

(b) II only

(c) III only

(d) I and III

(e) II and III

65. The sum of the series $1 + \frac{1}{4.2!} + \frac{1}{16.4!} + \frac{1}{64.6!} + \ldots$ is

(a) $\frac{e-1}{\sqrt{e}}$

(b) $\frac{e+1}{\sqrt{e}}$

(c) $\frac{e+1}{2\sqrt{e}}$

(d) $\frac{e-1}{2\sqrt{e}}$

(e) Nonexistent

66. Given $\sum_{n=1}^{\infty}(\frac{1}{n^n} - 0.9^n)$

(a) The series converges by p-series

(b) The series diverges

(c) The series converges

(d) No conclusion can be made

(e) None of these

67. The following is true about the series $\sum_{n=1}^{\infty} 2^{2n}3^{1-n}$ except:

(a) $\sum_{n=1}^{\infty} 2^{2n}3^{1-n} = \sum_{n=1}^{\infty} 4(\frac{4}{3})^{n-1}$

(b) The series is divergent

(c) The interval of convergence does not exist

(d) The series is convergent

(e) The series has $r > 1$ and $r < -1$

68. The sequence $a_n = \frac{n}{n^2+1}$ is

(a) Increasing but not monotonic

(b) Decreasing but not monotonic

(c) A monotonic sequence

(d) An increasing function

(e) None of these

69. The expression $\frac{1}{50}(\sqrt{\frac{1}{50}} + \sqrt{\frac{2}{50}} + \sqrt{\frac{3}{50}} + \ldots + \sqrt{\frac{50}{50}})$ is a Rieman sum approximation for

(a) $\int_0^1 \sqrt{\frac{x}{50}}dx$

(b) $\int_0^1 \sqrt{x}dx$

(c) $\frac{1}{50}\int_0^1 \sqrt{\frac{x}{50}}dx$

(d) $\frac{1}{50}\int_0^1 \sqrt{x}dx$

(e) $\frac{1}{50}\int_0^{50} \sqrt{x}dx$

70. The sum of the infinite geometric series $\frac{3}{2} + \frac{9}{16} + \frac{27}{128} + \frac{81}{1024} + \ldots$ is

(a) 1.6

(b) 2.35

(c) 2.40

(d) 2.45

(e) 2.50

COLLEGE OF SCIENCE OF SCIENCE

DEPARTMENT OF MATHEMATICS

MID - SEMESTER EXAMS April 2012 Time: 1hr

NAME: _____ INDEX : _____

Answer all questions by circling the correct answer on the question paper

1. Evaluate $\lim_{x\to 0}\frac{\tan 3x}{x}$

(a) Does not exist (b) 0 (c) 3 (d) 1 (e) None

2. Evaluate $\lim_{x\to 0}\frac{\cos ax - \cos bx}{x^2}$

(a) Does not exist (b) $\frac{1}{2}(b^2-a^2)$ (c) $\frac{1}{2}(b^2-a^2)$ (d) $\frac{1}{2}(b^2+a^2)$ (e) None

3. A function is said to be differentiable in an interval if

(a) If the derivative at a point within the interval exists

(b) If the function is continuously differentiable

(c) If the derivative at all points within the interval exists

(d) If the left – hand derivative exists

(e) None of the above

4. If $f(x)$ is continuous in a closed interval then is

(a) Differentiable in the interval

(b) Differentiable everywhere

(c) Is bounded in the interval

(d) Is unbounded in the interval

(e) None of the above

5. Which of the following statement about real numbers is false

(a) If x and y are in $\mathbb{R}^+$, so are $x+y$ and xy

(b) For every real $x \neq 0$, either $x \in \mathbb{R}^+$ or , $-x \in \mathbb{R}^+$ but not both.

(c) $0 \notin \mathbb{R}^+$

(d) For every $a,b \in \mathbb{R}$, $ab > 0$ if and only if both a and b are positive.

(e) None of the above

6. $\lim_{x\to 0}\frac{a^x-b^x}{x}$

(a) lna (b) lnb (c) $ln\frac{b}{a}$ (d) $ln\frac{a}{b}$

7. If x has the property that $0\le x<h$ for every positive real number h, then

(a) $x>0$ (b) $x>1$ (c) $x<-1$ $x<0$

8. A number B is called a least upper bound of a nonempty set S

(a) *If there exist a number less than B which is also an upper bound of S*

(b) *If no number less than B which is also an upper bound of S*

(c) Then B can also be the greatest lower bound

(d) Then B cannot be an upper bound for S

(e) None of the above

9. Choose the odd one out

(a) $Sinhx=\frac{e^x-e^{-x}}{2}$ (b) $\csc hx=\frac{2}{e^x-e^{-x}}$ (c) $Coshx=\frac{e^x+e^{-x}}{2}$

(d) $\tanh x=\frac{e^x-e^{-x}}{e^x+e^{-x}}$ (e) None of the above

10. Let $f(x)=\sqrt{2x-1}$ Evaluate $f'(5)$

(a) 2/3 (b) -2/3 (c) 1/3 (d) -1/3

11. The Sequence $U_n=\frac{\sqrt{n}}{n+1}$ is

(a) Monotonic increasing and bounded

(b) Monotonic decreasing and unbounded

(c) Monotonic decreasing and bounded

(d) Monotonic increasing and unbounded

(e) None of the above

12. Which of the following is the *well – ordering principle*

(a) *Every non-empty set of positive integers contains a smallest member.*

(b) *The set natural numbers is a closed set*

(c) *Given a>b, then a+c>b+c for c>0*

(d) *Given a>b, then ac=bc if c=0*

(e) None of the above

13. Find $\lim_{x\to a}\frac{\sin x-\sin a}{x-a}$

(a) Cos a (b) Sin a (c) 0 (d) 1 (e) None of the above

14. Find $\lim_{n\to\infty}\frac{1+2(10^n)}{5+3(10^n)}$

(c) $z-\frac{1}{3!}z^3-\frac{1}{5!}z^5-\frac{1}{7!}z^7+\ldots$ (d) $1-\frac{1}{2!}z^2+\frac{1}{4}z^4-\frac{1}{6!}z^6+\ldots$

25. $y=\operatorname{cosec}2x$ find $\frac{dy}{dx}$

(a) 2cosec2xcot2x (b) -2cosec2xcot2x (c) 2cosec2x (d) None

26. Evaluate $\int_1^{\infty}\frac{1}{\sqrt{x+1}}dx$

(a) $\frac{\pi}{2}$ (b) $-\frac{\pi}{2}$ (c) -2 (d) ∞

27. Find $\int_1^{\infty}\frac{x}{1+x^2}dx$

(a) ln2 (b) -ln2 (c) $\frac{\pi}{2}$ (d) ∞

28. Find the nth derivative $y=x^2 Inx$

(a) $(-1)^{n-1}[(n-1)!-2n(n-2)!+n(n-1)(n-3)!]$

(b) $X^{2-n}(-1)^{n-1}[(n-1)!-2n(n-2)!+n(n-1)(n-3)!]$

(c) $X^{2-n}(-1)^{n-1}[(n-1)!-2n(n+2)!+n(n-1)(n-3)!]$

(d) $(-1)^{n-1}[(n-1)!-2n(n-2)!+n(n-1)(n-3)!]$

29. If $x<0$ and $y>0$; and suppose that $|x|>|y|$

(a) then $x+y>0$ and $|x+y|\leq|x|+|y|$

(b) then $x+y>0$ and $|x+y|<|x|+|y|$

(c) then $x+y<0$ and $|x+y|\leq|x|+|y|$

(d) then $x+y<0$ and $|x+y|<|x|+|y|$

(e) None of the above.

30. If $x<0$ and $y>0$; and suppose that $|x|<|y|$

a) then $x+y>0$ and $|x+y|\leq|x|+|y|$

b) then $x+y>0$ and $|x+y|<|x|+|y|$

c) then $x+y<0$ and $|x+y|\leq|x|+|y|$

d) then $x+y<0$ and $|x+y|<|x|+|y|$

e) None of the above.

(a) 2/3 (b) 1/5 (c) Does not exist (d) 10 (e) None of the above

15. Find $\lim_{n\to\infty} t_n$ of the sequence defined by $t_1 = 1, t_{n+1} = \sqrt{t_n}$

(a) $\sqrt{3}$ (b) 1 (c) 2/3 (d) 3 (e) None of the above

16.

17. Determine the interval of continuity for $f(x) = \sqrt{x+5}$

(a) x>5 (b) x≥ -5 (c) All real values of x (d) x<-5 (e) none of the above

18. If $y = \operatorname{csch}(x^2 - 3x + 1)$, find $\frac{dy}{dx}$

N.B $\frac{d}{dx}\operatorname{Cosech} x = -\operatorname{cosech} x \coth x$

(a) $(2x-3)\sinh(x^2-3x+1)\operatorname{csch}(x^2-3x+1)$

(b) $(2x-3)\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$

(c) $-(2x-3)\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$ ✓

(d) $-\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$

(e) None of the above

$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

Note $\frac{\frac{d}{dt}\left(\frac{dy}{dx}\right)}{\frac{dx}{dt}} = \frac{d^2y}{dx^2}$

19. *if* $x = \sec t$ and $y = \tan t$, evaluate $\frac{d^2y}{dx^2}$ at $t = \frac{\pi}{4}$

(a) 1 (b) -2 (c) -1 (d) 0 (e) None of the above

20. Lactus rectum is to ellipse, whiles asymptotes is to

(a) Parabola (b) Rectangular (c) Circle (d) Hyperbola

21. Evaluate $\frac{d}{dx}(\tan^{-1}\sqrt{x})$

(a) $\frac{1}{\left(\sqrt{x}+\sqrt{x^3}\right)}$ (b) $\frac{1}{(1+x)}$ (c) $\frac{1}{\left(1+x^2\right)}$ (d) $\frac{1}{2\left(\sqrt{x}+\sqrt{x^3}\right)}$ ✓ (e) none

22. The normal at the point (2,4) on the parabola $y^2 = 8x$ meets the parabola again at the point T. Find the coordinates of the point T.

(a) (-18, -12) (b) (-12, 18) (c) (-18, 12) (d) (18, -12) (e) None of the above

23. Determine the eccentricity and the length of the lactus rectum of the ellipse $25x^2 + 64y^2 = 1600$

(a) 0.216 and 3.9 respectively

(b) 3.9 and 0.216 respectively

(c) 3.9 and 0.612 respectively

(d) 0.612 and 3.9 respectively

(e) None of the above

24. Find the Taylor Series expansion for $f(z) = \sin z$ about $z=0$

(a) $z - \frac{1}{3!}z^3 + \frac{1}{5!}z^5 - \frac{1}{7!}z^7 + \ldots$ (b) $1 + z - \frac{1}{2}z^2 + \frac{1}{\ldots}z^3 - \frac{1}{\ldots}$

Kwame Nkrumah University of Science and Technology
College of Science
Department of Mathematics
MATH 152: Engineering Mathematics II
End of Semester Examination
B.Sc.(Engineering I)

May, 2013 Time: 3hours

Shade the correct answer to the following set of questions on the scannable sheets provided. Answer booklet will be provided for rough work only.

1. Find any absolute or local maximum and minimum values of $f(x) = 8 - 2x$ if $x \geq 6$.
   (a) -4 is an absolute maximum
   (b) 6 is an absolute minimum
   (c) 6 is an local minimum
   (d) -4 is an absolute minimum
   (e) None of the above

2. Find the number c that satisfies the conclusion of the Mean Value Theorem on the given interval.
   (a) $c = 13/2$
   (b) $c = 4/9$
   (c) $c = 5$
   (d) $c = 25/4$
   (e) None of the above

3. Evaluate the indefinite integral $\int \frac{sin20t}{sin10t} dt$
   (a) $-\frac{sin10t}{5}$
   (b) $\frac{cos10t}{5}$
   (c) $\frac{sin10t}{10}$
   (d) $\frac{sin10t}{5}$
   (e) None of the above

4. Evaluate the indefinite integral $\int (\frac{1-x}{x})^2 dx$
   (a) $x - \frac{1}{2lnx} + C$
   (b) $x - 2lnx - \frac{1}{x} + C$
   (c) $1 - 2lnx + C$
   (d) $lnx - x + C$
   (e) None of the above

5. Evaluate the indefinite integral $\int e^{cosx} sinx dx$.
   (a) $e^{cosx} sinx + C$
   (b) $-e^{cosx} sinx + C$
   (c) $-sin(e^{cosx}) + C$
   (d) $e^{sinx} + C$
   (e) $-e^{cosx} + C$

6. Evaluate the indefinite integral by making the given substitution.
   $\int x^2\sqrt{(x^3+2)} dx$, $u = x^3 + 2$.
   (a) $-\frac{2}{9}(x^3+2)^{3/2} + C$
   (b) $\frac{1}{9}(x^3+2)^{1/2} + C$
   (c) $\frac{2}{9}(x^3+2)^{1/2} + C$
   (d) $\frac{2}{9}(x^3+3)^{3/2} + C$
   (e) $\frac{2}{9}(x^3+2)^{3/2} + C$

7. Find $\int_1^4 \frac{x^2+6}{\sqrt{x}}$.

(a) 37

(b) 21.4

(c) 24.4

(d) 74

(e) 49.2

8. Find the area of the region bounded by the curves.
$y = \cos x$, $y = \sin 2x$, $x = 0$, $x = \pi/2$

(a) $\frac{1}{4}$

(b) $\frac{3}{2}$

(c) $\frac{1}{3}$

(d) 2

(e) 4

9. Find the volume of the solid obtained by rotating the region bounded by $y = x^3$ and $x = y^3$ about the x-axis.

(a) $\frac{15}{56}\pi$

(b) $\frac{16}{7}\pi$

(c) $\frac{18}{55}\pi$

(d) $\frac{7}{2}$

(e) 16π

10. Differentiate $y = x^{6x}$.

(a) $y' = 6x^{6x}(6\ln x + 1)$

(b) $y' = 6(\ln x + 1)$

(c) $y' = 6x^{6x}(\ln x + 1)$

(d) $y' = -6x^{6x}(\ln x + 6)$

(e) $y' = x^x(\ln 6x + 1)$

11. Determine whether the sequence $a_n = e^{n/(n+1)}$ converges or diverges. If it converges, find the limit.

(a) $\ln 3$

(b) e

(c) $\ln(1/3)$

(d) e^n

(e) diverges

12. Which of the given series is absolutely convergent?

(a) $\sum_{n=1}^{\infty} \frac{\cos\frac{n\pi}{6}}{n\sqrt{n}}$

(b) $\sum_{n=1}^{\infty} \frac{\sin 3n}{n}$

13. Find the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^n x^n}{n+4}$

(a) $[-1, 1)$

(b) $[-1, 1]$

(c) $(-1, 1]$

(d) $(-1, 1)$

(e) diverges everywhere

14. Suppose that the radius of convergence of the power series $\sum_{n=0}^{\infty} C_n x^n$ is 16. What is the radius of convergence of the power series $\sum_{n=0}^{\infty} C_n x^{2n}$

(a) 256

(b) 4

(c) 1

(d) 16

(e) 232

15. Find the radius of convergence of the series $\sum_{n=1}^{\infty} \frac{n^4 x^n}{3^n}$

(a) $R = \infty$

(b) $R = 0$

(c) $R = 1$

(d) $R = 1/3$

(e) $R = 3$

16. Find the partial sum s_7 of the series $\sum_{n=1}^{\infty} \frac{2}{4+5^n}$. Give your answer to decimal places.

(a) $s_7 = 0.46301$

(b) $s_7 = 0.47999$

(c) $s_7 = 2.276$

(d) 0.466

(e) $s_7 = 0.566$

17. Let $A = \sum_{n=10}^{\infty} \frac{3}{n+n}$ and
Compare A and B.

(a) $A \geq B$

(b) $A \leq B$

(c) $A < B$

(d) $A > B$

(e) $A = B$

18. Determine whether
$\frac{1}{2n+1}$ is increasing,
monotonic.

(a) decreasing

(b) not monotoni

(c) increasing

(d) none of the a

19. Which of the followi
1.25

(a) $\int_0^{\infty} \frac{1}{x^{0.8}}$

(b) $\int_0^{\infty} \frac{1}{x^{0.3}}$

(c) $\int_0^{\infty} \frac{1}{x^{0.2}}$

(d) $\int_0^{\infty} \frac{1}{x^2}$

(e) none of the

20. Determine whether
is convergent or div

(a) divergent

(b) convergent

21. Find a formula fo
of the sequence,
tern of the first
$\{\frac{1}{2}, -\frac{4}{3}, \frac{9}{4}, -\frac{16}{5}, \frac{25}{6}$

(a) $a_n = \frac{(-1)^n}{2n}$

(b) $a_n = \frac{(-1)^n}{n}$

(c) $a_n = \frac{(-1)}{n}$

(d) $a_n = \frac{(-1)}{n}$

(e) none of

17. Let $A = \Sigma_{n=10}^{\infty} \frac{3}{n^{4.8}}$ and $B = \int_9^{\infty} \frac{3}{x^{4.8}} dx$. Compare A and B.

(a) $A \geq B$

(b) $A \leq B$

(c) $A < B$

(d) $A > B$

(e) $A = B$

18. Determine whether the sequence $a_n = \frac{1}{2n+1}$ is increasing, decreasing, or not monotonic.

(a) decreasing

(b) not monotonic

(c) increasing

(d) none of the above

19. Which of the following integrals is equal to 1.25

(a) $\int_0^{\infty} \frac{1}{x^{0.8}}$

(b) $\int_0^{\infty} \frac{1}{x^{0.3}}$

(c) $\int_0^{\infty} \frac{1}{x^{0.2}}$

(d) $\int_0^{\infty} \frac{1}{x^{x}}$

(e) none of the above

20. Determine whether the following integral is convergent or divergent $\int_1^{\infty} \frac{6 \ln 4x}{x}$

(a) divergent

(b) convergent

21. Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues. $\{\frac{1}{2}, -\frac{4}{3}, \frac{9}{4}, -\frac{16}{5}, \frac{25}{6}, ...\}$

(a) $a_n = \frac{(-1)^{n+1} n^2}{2n+1}$

(b) $a_n = \frac{(-1)^{n+1} n^2}{n+1}$

(c) $a_n = \frac{(-1)^{n+1} n}{n+1}$

(d) $a_n = \frac{(-1)^n n^2}{n+1}$

22. Calculate y' if $xy^4 + x^3 y = x + 3y$

(a) $y' = \frac{-y^4 - 2xy}{4xy^3 + x^3}$

(b) $y' = \frac{1 - y^4 - 2xy}{4xy^3 + x^3 - 3}$

(c) $y' = -\frac{xy^3 + 2x - 3}{x^2 y^2 (4x - 1)}$

(d) $y' = -\frac{1 - y^4 - 2x^2}{4xy^3 + x^4 - 3}$

(e) none of these

23. A closed set is a set which

(a) Contains some of its limit points

(b) Contains all of its cluster points

(c) has its limits points not members of the set

(d) lies in a half closed interval

(e) none of the above

24. Which of the following is not true?

(a) an infinite set may or may not have a limit point

(b) the set of rational numbers has infinitely many limit points

(c) a finite set cannot have a limit point

(d) every infinite set has a limit point

(e) none of the above

25. If $a, b \in \Re$ and $a + b \in \Re$, then

(a) addition is closed with respect to the set $\Re$

(b) addition is open with respect to the set $\Re$

(c) the set $\Re$ is closed with respect to addition

(d) the set $\Re$ is open with respect to addition

26. Why does the set $\{\frac{1}{2^n} : n = 1, 2, 3, ...\}$ satisfy the Weierstrass-Bolzano theorem?

(a) it is bounded and infinite
(b) it is countable and infinite
(c) it is unbounded and infinite
(d) it has only one limit point
(e) none of the above

27. The best method to test the convergence or divergence of the series $\Sigma_{n=1}^{\infty} \frac{n^n}{n!}$

(a) the quotient test
(b) the comparison test
(c) the n^{th} root test
(d) d'alambert's ratio test
(e) none of the above

28. Evaluate the $\int_0^1 3x^2 cosx^3 dx$

(a) $sin3$
(b) 0
(c) $3sin1$
(d) $cos1$
(e) none of the these

29. Find the anti-derivative of the function $f(x) = 18x^3 - 14x + 9$

(a) $F(x) = 36x^3 - 28x^4 + 9x + C$
(b) $F(x) = 6x^3 - 7x^2 + 9x + C$
(c) $F(x) = 18x^3 - 14x^2 + 9x + C$
(d) $F(x) = 36x - 14 + C$
(e) $F(x) = 6x^2 - 14x + c$

30. A function is said to be differentiable in an interval if

(a) I f the derivative at a point within the interval exist
(b) I f the function is continuously differentiable.
(c) I f the derivative at all points within the interval exists
(d) I f the left-hand derivative exists
(e) N one of the above

31. If $f(x)$ is continuous in a closed interval then it is

(a) D ifferentiable in the interval
(b) D ifferentiable everywhere
(c) B ounded in the interval
(d) U nbounded in the interval
(e) N one of the above

32. If x has the property that $0 \leq x < h$ for every positive real number h, then

(a) $x > 0$
(b) $x > 1$
(c) $x = 0$
(d) $x < 0$
(e) N one of the above

33. Which of the following relation is false

(a) $\sinh x = \frac{e^x - e^{-x}}{2}$
(b) $\operatorname{csc} hx = \frac{2}{e^x - e^{-x}}$
(c) $\cosh x = \frac{e^x + e^{-x}}{2}$
(d) $\tanh x = \frac{e^x - e^{-x}}{e^x + e^{-x}}$
(e) n one of the above.

34. Find $\lim_{n \to \infty} U_n$ of the sequence defined by $U_1 = 1, U_{n+1} = \sqrt{3U_n}$

(a) $\sqrt{3}$
(b) 1
(c) 2/3
(d) 3
(e) N one of the above.

35. Find the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{nx^n}{2^n}$

(a) $-2 \leq x \leq 2$
(b) $-2 < x < 2$
(c) $-2 < x \leq 2$
(d) N

36. Find the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{n(x-1)^n}{3^n(3n-1)}$

(a) $-2 \leq x \leq 4$

(b) $-1 < x < 3$

(c) $-2 < x < 4$

(d) N one of the above.

37. Evaluate $\lim_{n\to\infty} \frac{4-2n-2n^2}{4n^2+5n}$

(a) 0

(b) 1

(c) $-\frac{1}{2}$

(d) N one of the above.

38. Evaluate $\lim_{n\to\infty} \sqrt{\frac{4-2n-2n^2}{4n^2+5n}}$

(a) $\frac{1}{2}$

(b) 0

(c) 1

(d) N one of the above.

39. Evaluate $\lim_{n\to\infty} 2^{\frac{n+1}{n^2-1}}$

(a) 2

(b) 0

(c) 1

(d) N one of the above.

40. Evaluate $\frac{d}{dx}(\tan^{-1}\sqrt{x})$

(a) $\frac{1}{1+x^2}$

(b) $\frac{1}{1+x}$

(c) $\frac{1}{2(\sqrt{x}+\sqrt{x^3})}$

(d) $\frac{1}{\sqrt{x}+\sqrt{x^3}}$

(e) N one of the above.

41. The normal at the point $(2, 4)$ on the parabola $y^2 = 8x$ meets the parabola again at the point T. Find the coordinates of the point T.

(a) $(-12, 18)$

(b) $(18, -12)$

(c) $(-18, 12)$

(d) $(-18, -12)$

(e) N one of the above.

42. Determine the eccentricity and the length of the lactus rectum of the ellipse $25x^2 + 64y^2 = 1600$

(a) 0.216 and 3.9 respectively

(b) 3.9 and 0.612 respectively

(c) 0.612 and 3.9 respectively

(d) 3.9 and 0.216 respectively

(e) N one of the above

43. If $y = \operatorname{csch}(x^2 - 3x + 1)$, find $\frac{dy}{dx}$

(a) $(2x-3)\sinh(x^2-3x+1)\operatorname{csch}(x^2-3x+1)$

(b) $-(2x-3)\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$

(c) $(2x-3)\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$

(d) $\operatorname{csch}(x^2-3x+1)\coth(x^2-3x+1)$

(e) N one of the above

44. What is the first derivative of $y = 5x^4 + 4x - \frac{1}{2x^2} + \frac{1}{\sqrt{x}} - 3$ at $x = 0$

(a) -4

(b) 4

(c) 0

(d) D oes not exist

(e) N one of the above.

45. Determine the gradient of the curve $y = 3x^3 - 2x^2 + 5x - 2$ at the point $(0, -2)$.

(a) 1
(b) 12
(c) -5
(d) 5
(e) N one of the above.

46. Find $\frac{dy}{dx}$ of $y = e^t \ln t \cos t$

(a) $e^t\left\{\left(\frac{1}{t} + \ln t\right)\cos t + \ln t \sin t\right\}$
(b) $e^t\left\{\left(\frac{1}{t} - \ln t\right)\cos t - \ln t \sin t\right\}$
(c) $e^t\left\{\left(\frac{1}{t} - \ln t\right)\cos t + \ln t \sin t\right\}$
(d) $e^t\left\{\left(\frac{1}{t} + \ln t\right)\cos t - \ln t \sin t\right\}$
(e) N one of the above.

47. Evaluate $\frac{d^2y}{d\theta^2}$ when $\theta = 0$ given $y = 4\sec 2\theta$

(a) 1
(b) -16
(c) 16
(d) 0
(e) N one of the above.

48. The average value of a complex voltage waveform is given by

$$V_{AV} = \frac{1}{\pi}\int_0^{\pi}(10\sin\omega t + 2\sin 3\omega t + 2\sin 5\omega t)d(\omega t)$$

(a) 7.26
(b) -9.23
(c) -7.26
(d) 0.23
(e) N one of the above.

49. Evaluate $\int \frac{-3}{2x-1}dx$

(a) $-\frac{3}{2}\ln(2x-1)$
(b) $-\frac{3}{2}\ln(2x-1) + c$
(c) $\frac{3}{2}\ln(2x-1) + c$
(d) $\frac{3}{2}\ln(2x-1)$
(e) N one of the above.

50. The electrostatic potential on all parts of a conducting circular disc $x^2 + y^2 = 0$ of radius r is given by the equation $V = 2\pi\sigma\int_0^9 \frac{R}{\sqrt{R^2+r^2}}dR$. Determine the potential

(a) $-2\pi\sigma$
(b) $-18\pi\sigma$
(c) $2\pi\sigma$
(d) $18\pi\sigma$
(e) N one of the above.

51. In the study of a rigid rotor, the following integration occurs $Z_f = \int_0^{\infty}(2J+1)e^{\frac{-J(J+1)h^2}{8\pi^2 IkT}}dJ$. Determine Z_f for constant temperature T assuming h, I and k are constants.

(a) $\frac{8\pi^2 IkT}{h}$
(b) $-\frac{8\pi^2 IkT}{h}$
(c) $\frac{8\pi^2 IkT}{h^2}$
(d) $-\frac{8\pi^3 IkT}{h^2}$
(e) N one of the above.

52. In electrostatics, $E = \int_0^{\pi}\frac{a^2\sigma\sin\theta}{2\epsilon\sqrt{a^2+x^2-2ax\cos\theta}}d\theta$, where a, σ and ϵ are constants, x is greater than a, and is independent of θ. Compute E.

(a) π
(b) $\frac{a^2\sigma}{\epsilon x}$
(c) $\frac{x\sigma}{a^2\sigma}$
(d) $-\frac{x\sigma}{a^2\sigma}$
(e) N one of the above.

53. The foci of an ellipse are $(-3,1)$ and $(-1,1)$, and the eccentricity is $1/3$. Find the equation of the ellipse.

(a) $\frac{(x+1)^2}{9} + \frac{(y+2)^2}{8} = 1$

(b) $\frac{(x+2)^2}{8} + \frac{(y-1)^2}{9} = 1$

(c) $\frac{(x+2)^2}{8} + \frac{(y-1)^2}{9} = 1$

(d) $\frac{(x-1)^2}{8} - \frac{(y+2)^2}{9} = 1$

(e) N one of the above.

54. Which of the following is correct as a definition of a limit point l for a set A.

(a) e very δ-neighbourhood of l contains at least an element of A.

(b) e very deleted δ-neighbourhood of l contains at least an element of A.

(c) e very deleted δ-neighbourhood of l contains all elements of A.

(d) s ome deleted δ-neighbourhood of l contains at least an element of A.

(e) N one of the above.

55. If the sum of the first $2n$ terms of an A.P. $2, 5, 8, \ldots$, is equal to the sum of the first n terms of an A.P $57, 59, 61, \ldots$, then n equals

(a) 11.

(b) 12.

(c) 13.

(d) 10.

(e) N one of the above.

56. $\sum U_n$ is a series of constants for which $\lim_{n\to\infty} U_n = 0$. Which of the following statements is true?

(a) $\sum U_n$ is a positive series

(b) $\sum U_n$ does not diverge to infinity

(c) $\sum U_n$ equals zero

(d) $\sum U_n$ converges to a finite sum

(e) N one of the above.

57. The radius of convergence of the series $\sum_{n=1}^{\infty} \frac{n^n x^n}{(n!)^2}$ is

(a) $\frac{2}{e}$

(b) $\frac{e}{2}$

(c) 2

(d) 0

(e) N one of the above.

58. The sum of the series $\sum_{n=1}^{\infty} (\frac{\pi^3}{3^\pi})^n$ is

(a) $\frac{\pi^3}{3^\pi - \pi^3}$

(b) $\frac{3^\pi}{\pi^3 - 3^\pi}$

(c) 1

(d) 0

(e) N one of the above.

59. Write the equation of a hyperbola with vertices $(3,-2)$ and $(-9,-2)$, and foci at $(7,-2)$ and $(-13,-2)$

(a) $\frac{(x-3)^2}{64} - \frac{(y-2)^2}{36} = 1$

(b) $\frac{(x+3)^2}{36} - \frac{(y+2)^2}{64} = 1$

(c) $\frac{(x+3)^2}{36} - \frac{(y+2)^2}{64} = 1$

(d) $\frac{(x-3)^2}{36} - \frac{(y-2)^2}{64} = 1$

(e) N one of the above

60. Find the nth derivative of $y = x^2 lnx$

(a) $(-1)^{n-1}[(n-1)! - 2n(n-2)! + n(n-1)(n-3)!]$

(b) $x^{2-n}(-1)^{n-1}[(n-1)! - 2n(n-2)! + n(n-1)(n-3)!]$

(c) $x^{2-n}(-1)^{n-1}[(n-1)! - 2n(n+2)! + n(n-1)(n-3)!]$

(d) $(-1)^{n-1}[(n-1)! - 2n(n+2)! + n(n-1)(n-3)!]$

(e) None of the above.

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KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
COLLEGE OF ART AND SOCIAL SCIENCES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ENGLISH

Second Semester Examinations, May 2014

ENGL 158: COMMUNICATION SKILLS II

MAY, 2014 TIME: TWO HOURS

CANDIDATE'S DEPARTMENT ----------

INDEX NUMBER ----------

CANDIDATES MUST NOT TAKE THIS PAPER OUT OF THE EXAMINATION HALL.

SECTION A: Select ONE of the following questions and answer it in the answer booklet provided.

1. a. What are the obvious signals that would suggest that there are communication problems within an organization? What solutions would you recommend to offset these problems?

   b. Your office has problems. Staff misuse the phones that the office has installed, leading to escalating monthly bills. Calls take too long; many are unrelated to business etc. Write a memo to remind staff about how to optimize the use of the phone system at the office.

2. You have been asked by the District Chief Executive in your district to speak to the senior officers in the district office about the use of information technology to speed up development. Indicate three problems you would have when preparing for this speech.

   b) Write a stirring speech on the topic 'Information Technology and Development'. The speech must be about thirty minutes long. Clearly indicate the Introduction, the Body and the Conclusion.

3. Turnstyles Resources is a supplier of electrical power in Nigeria. Internal communication at Turnstyles is largely through the written medium, particularly through memos, reports, letters emails, sms etc.BullsEyeInc is a supplier of gas in Ghana. Internal communication at BullsEye is basically through a mix of media with a larger dose of face-to-face interaction.What are the comparative

advantages of the internal communication systems of the two business organizations?

b. You mention in a conversation with your new manager that you consider morale at the workplace to be lower than expected, because facilities for staff motivation are either non-existent or inadequate. Your boss thinks for a moment and says, "Why don't you put something in writing for me ...' and make some recommendations too. I might discuss it with the others at the next management meeting."Using the appropriate format, write out your ideas for the consideration of management.

4. You are the secretary of the Town Development Committee in your village. You have been asked to summon a meeting of the executives of the committee to discuss pressing issues about the welfare of the village. Send out the notice using the memo format.

b) The meeting has been held. Write down narrative minutes for the meeting.

SECTION B: Give short answers to the following questions. Write your answers on the question paper in the spaces provided.

1. Explain the following literacies:
   a. Functional Literacy:

   _____

   _____

   b. Information literacy:

   _____

   _____

2. What are the first three things a chairperson does to open a meeting?
   a. _____

   _____

   b. _____

3. Explain the nature/nurture cause of communication apprehension.
   a. Nature

   b. Nurture

4. State one advantage and one disadvantage of using handouts in class.
   a. Advantage

   b. Disadvantage

5. Write down and explain two types of listening:

6. What are the events involved in the process of communication?

7. When a person talks to himself why can we say he is communicating?

8. Explain why poor handwriting is an example of technical noise.

9. Write down the objective of the International Reading Association.

10. At a meeting, in what way is a show of hands better than the voice vote when it comes to deciding on issues through voting?

11. Write down two advantages of using the e-mail for communication in a large organization like KNUST.

12. In two sentences explain why narrative minutes are difficult to record.

13. What is the main objective of a letter of complaint?

14. List two problems presented by the grapevine or informal communication in an organization.

15. Explain 'Terms of Reference'.

16. Audience analysis is important for any speaker. Write down two ways in which a scientific audience analysis helps a speaker.

17. In Ghana people w

18. What are two adva

19. Explain the follow
a. Quorum

b. Proxy.

20. Write down any

17. In Ghana people write proposals for two main reasons. What are they?

18. What are two advantages of resolution minutes?

19. Explain the following terms:
    a. Quorum

    b. Proxy.

20. Write down any two features of a bureaucracy.

SECTION C: Answer the following questions on the scannable sheet provided. Mark the answers on the question paper.

1. When we communicate, it is an attempt to

   A. improve listening and productive skills.
   B. solve a problem or show the need for survival
   C. see survival not as mere existence but rather a meaningful one.
   D. show that the act is indispensable in human existence

2. Which of the following factors does not influence the communication process? The

   A. nature of participants
   B. goals of interaction
   C. nature of the subject
   D. seating arrangement

3. All the following are the main components of communication EXCEPT

   A. Message or information
   B. Source or sender
   C. Destination or Receiver
   D. Setting or place

4. The communication process involves change because of the

   A. positive moment from the beginning to the end
   B. changing roles of the participants of the interaction.
   C. effect the communicative experience has on the receiver of a message.
   D. changing emotions of the sender of a message.

5. The way in which the message is transmitted is referred to as the

   A. line
   B. route
   C. channel
   D. direction

6. Which of the following shows the state of pleasantness when one's states are in agreement with the message?

   A. confidentiality
   B. credibility
   C. congeniality
   D. sustainability

7. Effective communication is that which
   A. ends in the achievement of desired goals
   B. receives positive responses from the receiver
   C. makes the intended message understood
   D. shows the speaker's attitude towards the subject and the receiver.

8. All the following are about non-verbal communication EXCEPT ONE. Pick the odd one out.
   A. It is used to complement verbal communication
   B. It does not involve the use of words
   C. It is open to different interpretations by different cultures.
   D. It is made up of body language and graphics only.

9. Which of the following cases is NOT interpersonal communication
   A. between one individual and a group
   B. between two individuals
   C. between a group and an individual
   D. between an individual and the inner self

10. In communication, the meaning of a message may be lost through all the following EXCEPT.
   A. an incorrect or wrong use of words
   B. the use of unfamiliar and unexplained diagrams or pictures.
   C. the use of ambiguous language
   D. an attempt by the receiver to reject the message.

11. One of the following refers to distractions and interference in the environment in which communication takes place.
   A. Distortion
   B. Noise
   C. the grapevine
   D. obstruction

12. One of these is not an interpretation for the use of silence
   A. To show agreement or consent to a proposal
   B. To indicate a feeling of sorrow or discomfort
   C. As a punitive measure for a wrongdoing
   D. As a sign of respect and submissiveness

13. The skills required in sending messages include the following EXCEPT ONE.
   A. selection
   B. organisation
   C. interpretation
   D. manipulation

14. In order to improve upon oral and verbal skills of language use we need to apply the following EXCEPT ONE.
    A. A clear articulation or pronunciation
    B. A suitable or appropriate vocabulary
    C. Appropriate tone of voice
    D. A proper understanding of non-verbal cues.

15. All the following are techniques for reading EXCEPT ONE.
    A. Know what you are looking for
    B. Get an idea of the content of what you are reading
    C. Familiarize yourself with the structure and core points
    D. Pause and find the meanings of unfamiliar words from the dictionary.

16. Pick the odd one from the list below
    A. Narrative minutes
    B. Resolution Minutes
    C. Action Minutes
    D. Descriptive Minutes

17. Which of the following is NOT communicating downwards? Giving
    A. information about objectives, instructions or job schedules
    B. information about procedures and practices in the organisation
    C. an appraisal showing how well or badly a worker is performing
    D. a report from a subordinate on a task he has been assigned to perform.

18. One of the moves below will NOT help to improve upward communication.
    A. Giving collective Bargaining Agreement
    B. Holding regular meetings with representatives of workers
    C. Introducing suggestion boxes as a channel for worker's complaints.
    D. Training managers to communicate more effectively using organisation's in-house style.

19. The informal spreading of messages in an organisation where there is a big communication gap is referred to as
    A. networking
    B. the grapevine
    C. indoctrination
    D. 'news swapping'

20. To write a good and effective document the following features are helpful EXCEPT ONE.
    A. Purpose
    B. Audience
    C. Style
    D. Response

21. Which of the following is NOT an official correspondence?
    A. Inquiry Letter
    B. Job application letter
    C. Complaint letter
    D. Personal letter

22. For effective oral communication to be achieved, the speaker must do the following EXCEPT ONE.
    A. speak with precision and clarity
    B. speak forcefully and persuasively
    C. use the appropriate tone of voice
    D. stand in the middle of the audience

23. The following are some of the reasons why people ask questions. Pick the odd one out.
    A. To seek clarification of a point that is not clear
    B. To have the platform to add information of their own.
    C. To divert attention away from what is being discussed
    D. To announce their presence among the gathering

24. Which of the following interviews are conducted to diffuse a potentially explosive situation in an organisation?
    A. Disciplinary interviews
    B. Counselling interviews
    C. Conflict-resolution interviews
    D. Information-gathering interviews

25. You will perform well in an interview if you do all the following EXCEPT ONE.
    A. Use your body language effectively
    B. Listen attentively and actively.
    C. Construct and present logical views.
    D. Familiarise with the panel members.

26. The job application letter should include the following information with the exception of one.
    A. Education
    B. Experience
    C. Reference
    D. Recommendation

27. The purpose of a letter of recommendation is to
    A. market one's suitability for a job.
    B. specify relevant facts and opinions about an applicant
    C. project a positive image of an applicant
    D. indicate that an applicant is ready for an interview

28. Which of the following aptly describes the memo?
    A. It is a form of written communication within an organisation.
    B. It has the same format of an official letter
    C. It may be used for external communication
    D. It is a summary of all the directives or instructions given in an establishment.

29. One of the following is NOT a feature of the memorandum.
    A. To
    B. From
    C. Subject
    D. Address

30. The statements below are TRUE about formal meetings EXCEPT ONE. Pick the odd one out. They are organized
    A. any time it is deemed expedient to do so
    B. by rules and regulations or conventions laid down in an organisation
    C. to make or take decisions for the progress of an organisation
    D. to initiate participatory problems solving through consultation with colleagues.

31. One of the following is NOT a major function of the minutes of a meeting.
    A. As a Record of Decision
    B As a Reflection of Consensus
    C. As a Guide to Management and Staff
    D. As a check on Attendance and Punctuality

32. During formal meetings an appreciable level of distance and strictness should be observed in order to ensure the following EXCEPT ONE.
A. appropriate and ordered behaviour or conduct .
B. attendance to the object or agenda of meeting
C. making of decisions which will guide the future of the organisation
D. making the refreshment provided suffice all members.

33. Action minutes are all the following but one
A. they are closer to resolution minutes
B. they emphasize the strategies by which the decision are implemented
C. they may be said to be an answer to the question of who executes decision taken.
D. they describe in detail the various contributions which precede decisions taken during meetings.

34. The introductory part of a report serves all these purposes EXCEPT
A. To prepare the mind of the reader for the findings and conclusions
B. Highlighting the events which promoted the authorisation of the investigation.
C. Giving the nature of the authorisation or terms of reference
D. To express members' appreciation for the opportunity given them to serve in their various capacities.

35. One of the following is NOT a method or procedure for collecting data for a formal report.
A. interviews
B. visits
C. observation
D. suggestions

36. Which of the following documents accompanies a formal report?
A. A letter of inquiry
B. A letter of transmittal
C. A letter of recommendation
D. A letter of acceptance

37. Which of these is not true about listening We listen to/for
A. information
B. evaluate
C. enjoyment
D. manipulate

38. The act of listening involves the following EXCEPT ONE.
    A. It is a voluntary action
    B. It implies paying attention to sound
    C. It requires the making of meaning out of oral communication
    D. It is the same process as the act of hearing

39. An exercise to identify or locate some words, expressions or figures in a written or typed material is referred to as ...
    A. previewing
    B. skimming
    C. scanning
    D. processing

40. Which of the following features is NOT seen in a writer's inside address and date
    A. The writer's name
    B. A comma after the name of the month
    C. The use of the indented style
    D. A full stop after the year

EXAMINERS

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