DIWALI WORKSHEET: 2023-24
STD – XI COMMERCE

BUSINESS STUDIES (054)

1. Kiran is a sole proprietor. Over the past decade, her business has grown from operating a neighbourhood corner shop selling accessories such as artificial jewellery, bags, hair clips and nail art to a retail chain with three branches in the city. Although she looks after the varied functions in all the branches, she is wondering whether she should form a company to better manage the business.
(a) Explain two benefits of remaining a sole proprietor.
(b) Explain three benefits of converting to a joint stock company.

2. "The Certificate of Incorporation is a conclusive evidence of the legal existence of the company." Explain the statement with help of some examples.

3. Finance is called the life blood of any business." Explain.

4. "There is not a single best source of funds for all organisations." Defend or Refute the statement.

5. Distinguish between fixed capital and working capital requirements of a business enterprise.

6. Distinguish between 'owner's funds' and 'borrowed funds.

7. Explain 'Debentures' as an important instrument for raising long term debt capital.

8. Explain 'Inter Corporate Deposits (ICDs)' as an important source of finance of a large corporate.

9. Gas authority of India Ltd. (GAIL) is carrying on various projects of energy and power. Majority of its shares are held by government of India. It is registered under Companies Act, 2013 and enjoy all the characteristics of a company. The board of directors are appointed by the government. The Board and shareholders are responsible for the efficient working of the company. The company prepares its annual report and submit to appropriate authorities.
(a) Name the type of public sector enterprise referred in above para.
(b) Government buys shares in whose name?
(c) Where does government companies submit their reports?

10. Mansi is running a general store. The store was insured against natural disaster like flood. Earthquake and fire from Hindustan General Insurance Company for the amount of 150 lacs. Heavy raining in the city caused massive flood. This left the store without any security. The store was looted by people which was caught on CCTV. She claimed from the insurance company the amount of damage of 13 lacs for the material and furniture spoiled from flood and also 25 lacs for the loss of material by theft, she also claimed another 25 lacs for now converting the store into fully AC and additional floor for more storage space. Insurance after assessing the damage to the property and stock due to flood and seeing the CCTV footage accepted the claim of 13 lacs. Mansi argued that as she has being paying premium for *50 lacs she should be paid the full claim of 243 lacs.
(a) What is the fundamental principle of insurance?
(b) Identify and explain the principles of insurance involved by insurance company by accepting the claim amount.

PHYSICAL EDUCATION (048)

PRACTICAL - 1: FITNESS TESTS

MOTOR FITNESS TEST

Motor fitness refers to the capability of an athlete to take part effectively in his/her particular sport. It can also be said that a person's ability to do physical activities. The following test items are:

1) Modified Push Ups (Girls)
2) Push Up (Boys)
3) Sit And Reach
4) Standing Broad Jump
5) Partial Curl Up
6) 4 × 10 M Shuttle Run
7) 50 M Standing Start
8) 600 M Run/Walk.

1. Modified Push Ups (Girls)

(a) Purpose: To measure the upper body strength and endurance.

(b) Equipment required: A mat and paper to record the basic information like age, gender and push-ups performed.

(c) Procedure: The subject is asked to take starting positions, for modified push-ups hands and knees should touch themat/floor. Both hands should be shoulder width apart and elbows fully extended. The body from the knees, to the hips and to the shoulders should be in a straight line. While keeping this position, the subject should lower her upper body, so that elbows may bend to 90 degree. Then the subject returns back to the starting position.

(d) Scoring: Count the total number of modified push-ups for record.

2. PUSH UPS (BOYS)

(a) Purpose: To test or measure the upper body strength and endurance.

(b) Equipment Required: A floor mat and a paper to record basic information such as age, gender and total number of push-ups performed.

(c) Procedure: After proper warming up, ask the subject to take position. In a push up position hands and toes should touch the mat/floor. Hands should be shoulder width apart. The upper body and legs should be in a straight line. Elbows should be fully extended keeping the back and keens straight, the subject lowers the upper body so that elbows may bend to 90 degrees or chest may touch the mat /floor, then returns back to the starting position with the arms extended

(d) Scoring: Count the total number of push-ups for record.

3. SIT AND REACH

- The sit-and-reach test was first propounded by Wells and Dillon in 1952.

(a) Purpose: To measure the flexibility of hip region including the lower back and hamstring muscles.

(b) Equipment Requirement: sit and reach box or a makeshift ruler and a box may be used in which the zero mark can be adjusted for each individual according to their sitting reach level because there is a variation of lengths of individual's arms and legs.

(c) Procedure: First of all, Shoes should be removed. Then sit down on the floor with legs stretched out straight ahead. The soles of the feet should be kept flat against the box. Both the knees should be locked and pressed flat to the floor. An assistant may hold the knees down. Palm should be facing downwards. Hand should be on top of the each other or side by side. The individual, whose flexibility is to be measured tries to extend his/her both hands forward along the measuring line on the box as far as he/she can extend.

(d) Scoring: the score is recorded to the nearest centimeter or half inches based on the distance reached by the fingertips of both hands.

4. STANDING BROAD JUMP

(a) Purpose: To measure explosive strength/ power of legs.

(b) Equipment required: A sandy long jump pit and a measuring steel tape.

(c) Procedure: A take-off line is marked on the ground. Subject stands just behind the take-off line with the feet several inches apart. The subject swings the arms and bends the knees to take a jump in the long jump pit.

(d) Scoring: The measurement is noted in feet and inches.

5. PARTIAL CURL UP

(a) Purpose: To test the strength and endurance of abdominal muscles.

(b) Equipment's required: A flat clean and cushioned surfaced, recording sheet and pen.

(c) Procedure: First of all, the complete test procedure is explained to the subject. After that the subject lies in supine on cushioned surface the knees should be flexed and feet should be 12 inches from the buttocks .Both the feet's should be slightly apart. Arms are extended and rested on thighs. Head should be in neutral position. This is the starting position. Then, the subject curls up with a slow controlled movement, until his/her shouldered come off the cushioned surface or mat two inches then back down again.

(d) Scoring: Record the total no of partial curl ups. It should not be counted if the shoulders are not raised up by two inches.

6. 4 × 10 M SHUTTLE RUN

(a) Purpose: To measure agility

(b) Equipment required: Two wooden blocks, marker cones, measuring tape, stopwatch and a flat surface with two lines 10 m apart

(c) Procedure: Mark two parallel lines 3 meters in length, 10 meters apart using marking tape or cones, considering one line as starting line. On the signal 'go' the subject runs to the wooden blocks, lifts one block, returns to the starting line and places the block behind the line. Then the subject returns to the second block, lifts it and then runs across the starting line on the way back.

(d) Scoring: Record the best time to complete the test in seconds.

7. 50 M STANDING START

(a) Purpose: To Determine Speed.

(b) Equipment Required: Measuring Tape to Marked Track, 2 Stop Watches.

(c) Procedure: An area of 50 m is marked on a track. Two parallel lines are drawn 50 m apart considering one as the starting line. The subject takes the starting position behind the starting line. The starter commands 'Ready' and 'Go'. The word Go is accompanied by a downward sweep of the starters arm as a signal to the timer. Two subjects can run at the same time if there are two stopwatches.

(d) Scoring: The score is recorded in seconds.

8. 600 M RUN/WALK

(a) Purpose: To Measure Endurance.

(b) Equipment Required: 600 MTS Track And Stop Watches.

(c) Procedure: The subject takes the position of standing right behind the starting line at the signal of ready and go the subject starts running. During the course of running he/she may walk also. Many students can run at a same time.

(d) Scoring: Time is recorded in minutes and seconds.

PRACTICAL-2: ASANAS FOR LIFESTYLE DISEASE

1. OBESITY:-Now days obesity has become a problem for the whole world obesity is a condition in which the amount of fat in the body increase to a very large extent. If a person is having BMI-30 he/she would be considered as obese. In other words, we can say obesity is when a person's weight is 20%or more than the ideal weight. There are two main reasons for obesity the bad habits of eating and deterioration of the digestive system. In such a person's life, there is no physical activity at all.

- **VAJARASANA : (THUNDERBOLT POSE)**

(a) Procedure: Sit and keep both leg straight. Fold right leg and place it under right butt. Fold left leg and place it under left butt. Keep your spine, neck and head straight, interlock your toes, open your ankle and sit on it. Knees should be touching the ground with each other. Keep both hands on your knees and look straight.

(b) Benefits: This asana is for meditation.

i. Strengthens pelvic muscles.

ii. It can be practiced after having food. It enhances digestion process.
iii. Stabilizes mind and body.
iv. Helps in sciatica
v. It cures indigestion and improves metabolism.
vi. Improves flexibility in ankles.
vii. It gives strength to the tight muscles.
viii. Improve blood circulation.

(c) Contraindications :

i. Vajrasana should not be practiced by the people who have severe arthritis of the knee.
ii. Runners should avoid this if they have injury in their hamstrings or the calves.

- **TRIKONASAN (TRIANGLE POSE)**

(a) Procedure: While inhaling stretches your right hand towards sky, arm should touch the ear. Bend left side slowly while exhaling, till it comes horizontal to the earth. Left hand should touch the ground or touch the left leg, knee should be straight. Inhale, come back to starting position. Change hand position and repeat it from another side.

(b) Benefits:

i. Trikonasana helps in digestions.
ii. Therapeutics for stress, anxiety, infertility, neck pain, sciatica.
iii. Heals Backache (in initial stage)
iv. Help women during their menstrual cycle.
v. Improve flexibility of vest and spine.

(c) Contraindication:-

i. Avoid if having low or high blood pressure.
ii. Avoid this pose if having any kind of neck injury.
iii. Avoid if having back injury.
iv. Avoid if an athlete having hamstring injury.

2. DIABETES

Diabetes is commonly known as metabolic disorder characterized by high blood sugar level over a prolonged period. Diabetes is due to either the pancreas not producing enough insulin or the cell for the body not responding properly to the insulin produced, Due to diabetes the individual has fatigue, frequent urination, increased thirst and increased Hunger. It may cause blurred vision, Kidney failure, cardio vascular disease, loss of weight etc.

- **ARDHYAMATSYENDRA**

(a) Procedure: Sit and keep both legs straight bending the knee of the right feet and put right heel below the left hip. Bend left leg and placed the left foot to the right side of the right knee. Keep left knee closed to the chest. Exhale from the right nostril and turns towards left and touch the toe of the left leg from the right hand. Body and head moves towards the left. Repeat while changing the position of legs.

(b) Benefits:

i. Help nervous system and strengthen the back bone,
ii. Stretching improves flexibility and tones the muscles.
iii. Controls menstrual cycle in women and brings shine on face.
iv. Also controls secretion from pancreas gland.
v. Reduces fat and helps in controlling obesity.
vi. This pose flexes the lower part of the body making the hip stronger and toned.

- **PASCHIMOTTANASANA:**

(a) Procedure: Sit down with your legs stretching straight in front of you. Keep your head, neck and spine erect and stretch hands upwards with a deep breath. Now, exhale and bend your head

and trunk slowly forward to catch the toes with the thumb. Try to touch head, chest and stomach to the legs and elbows to the floor.

(b) Benefits:

i. It improves digestive system and much blocked gas get released.
ii. Improves the respiratory system.
iii. Improve the alignment of the vertebral column.
iv. Helps as a therapy for diabetic patient, with weak lever and kidney.
v. Benefits women during menstrual disorder.

(c) Contraindications:

i. Avoid of having slip disc problem.
ii. Someone who is suffering from hernia should avoid this pose.
iii. Pregnant women should avoid this pose.
iv. Person having Spondylitis should avoid this pose.

3. ASTHMA

Asthma, a disease associated with the respiratory tract swelling occurs, which makes the tracts very sensitive and makes this process pungent with the touch of any effective thing.

These reactions cause contraction in the tubes this reduces the amount of air in the lungs. Due to which it become difficult to breath. Common symptoms of asthma are coughing, heavy breathing. Chest tightness, fatigue, pain in hands, feet, shoulders and back. Reasons are dust, smoke, air pollution, pollen grains, animal's skin, hair or feathers etc. are the main reasons.

- **PARVATASANA:** While performing this asana body resembles like a mountain that's why it's named as parvatasana. It is a very easy asana.

(a) Procedure: Sit in padmasana pose on ground. Raise both hands by side ward while inhaling and joint together upward above the head. Exhale and come at initial position.

(b) Benefits:

i. It helps to spinal problem.
ii. Strengthens the muscles of arms
iii. If increase the blood flow to the brain.

(c) Contraindications :

i. It should not be practices if one has wrist, hip or ankle injury.
ii. It should not be practice while spinal injury.

- **GOMUKHASANA:** This asana gets its name because while doing this asana body resembles a cow face pose. In English it is called the cow face pose.

(a) Procedure: Sit in sukhasana or dandasana pose. Place the ankle of left leg near right but under the anus. Place the right leg over the left leg so that knees should place over left knee. Sweep your left hand behind your back, facing palms upwards. Sweep your right hand over the right shoulder, bend your elbow and place it behind your back. Now inter lock fingers of both hands behind your back. Now stretch both hands in their respective directions. Look straight. Repeat with changing leg position.

(b) Benefits:

i. Helps in curing Asthma, reduce weight makes body flexible and attractive.
ii. It helps to make spine strong and erect.
iii. Helps to make abdominal organ function well.
iv. It helps to circulate blood to the entire body.

(c) Contraindications:

i. Person having stiff shoulder should avoid this.
ii. Any kind of hip problem or knee, hamstring and quadriceps should be avoided.

iii. If one has to sciatica problem, one should avoid this pose.

4. **HYPERTENSION:** High blood pressure is a condition in which the strength of blood against the walls of the artery is very high. All these factors can lead to high blood pressure. The main function of the heart is to supply pure blood to the various parts of the body through different arteries when the heart contract it pushes the blood through blood vessels and consequently the blood pressure increase in arteries this pressure is known as systolic blood pressure it is represented by the first number the pressure between two heartbeats is called diastolic blood pressure it is represented by bottom or second number these two number of blood pressure are measured in mm/Hg. Unit means millimeter of mercury. The normal blood pressure of an adult is considered 120/80mm/ Hg. The person whose blood pressure readings are beyond 140/90 mm/Hg are said to be having hypertension.

- **ARDH CHAKARASANA:**
  - **(a) Procedure:** Stand straight and keep your hand close to your body. Place your hands on your buttocks. Breathing gently, bends backwards while keeping the knees straight. Stay for sometime in this position. Come back to starting position.
  - **(b) Benefits:**
    i. Strengthen back bone.
    ii. High BP comes to normal.
    iii. Tones the arms and shoulder muscles.
  - **(c) Contradictions:** Keep knees straight while bend backwards.
- **PAVANMUKTASANA:**
  - **(a) Procedure:** Lie flat on your back and keep the legs straight. Inhale slowly and lift the legs and bend the knees. Bring knee upwards to the chest till your thigh touches the stomach. Hug your knees and lock your fingers, touch your chin to the knee while exhaling. Repeat it with another leg.
  - **(b) Benefits:**
    i. Strengthen the back and abdominal muscle, leg and hip.
    ii. Intestine gets massaged; also bring fresh blood to lower abdomen.
    iii. Helps in spondolytis.
    iv. Remove excess fat around the lower abdomen.
    v. Release excess heat, toxins from organs and tissues.
  - **(c) Contraindications:**
    i. Avoid while suffering from severe back or neck pain.
    ii. Avoid this pose completely, if having slip disc problem.
    iii. Those with internal organs issues may find this pose difficult and painful.
    iv. It should be avoided while pregnancy.

PRACTICAL-3: GAME AND SPORTS

➢ HISTORY OF BASKETBALL

Basketball was invented in 1891 by Dr James Naismith, a Canadian of Scottish descent at Springfield College Massachusetts. The college was the International YMCA Training School and the game was invented to provide an indoor activity for trainee YMCA leaders.

When the game was first played, peach baskets were nailed up at each end of the gymnasium as "goals", hence the origin of the name "basketball". The first set of rules was published and distributed through the YMCA movement in 1892 and this resulted in the game spreading rapidly throughout Canada and the USA. 1892 also saw the game played in England for the first time at Birkenhead YMCA after the Club President was the game played whilst on a business trip to Canada. In 1893 the game was introduced into the Physical Training College in Hampstead (now Dartford College of PE) by Madame Berman Osterberg. Changes to the game to suit the girls led to the first rules of netball being published in 1901.

By in 1924 it was introduced as a demonstration sport at the Paris Olympic Games and Great Britain won the title. 1927 saw Abe Saperstein a Londoner from the world famous Harlem Globetrotters and in 1931 FIBA the International Basketball Federation was formed with a Welshman as its first secretary.
The England Basketball Association was formed in 1936, 13 years before the NBA was formed in America, and by 1957 the English Schools Basketball Association was formed. By 1990 there were 117 member countries in FIBA making basketball the second largest of all the world's governing bodies and also the world's fastest growing and largest participation sport. It is also used widely as a community activity as anyone of any age or gender can participate.

➢ GROUND MEASUREMENTS

MAIN TIPS AT A GLANCE

1. Numbers of teams = 2
2. Numbers of court players in team = 5
3. Number of substitutes in a team = 7
4. Total players = 12
5. Size of basketball court = 28X15m
6. Radius of centre circle = 1.80m
7. Breath of boundary lines = 5cm
8. Thickness of black board = 3cm
9. Height of lower edge of board from the floor = 2.90m
10. Circumference of the ball = 75cm to 78cm
11. Weight of ball = 600gm to 650gm
12. Duration of basketball game = Four duration of 10 minute each
13. Interval between two duration = [10-2-10-10-10-2-10]
14. Officials = 5(1-Referee, 1-Umpire, 1-scores, 1-Time keeper, 1-24 Second operator)

➢ LATEST GENERAL RULES

1) Now the length of the basketball court is15m×28m.
2) Now the leather ball is used in basketball competitions.
3) The last 2 minute play before the end of the game should be played in real sense and not to pass the time.
4) Now three time-outs are provided during the game to each team but in first half only two time-out will be given to each team.
5) The poles should be at least 2m away from the end line.
6) Now the throw can be given from the end line.
7) 30 seconds ruled has been changed to 24 seconds.
8) Now there are four periods of the game that is 10-10-10-10 minutes.
9) A rectangular shaped restricted area has been introduced.
10) The distance of three points line has been extended to 6.75m whereas, earlier it was 6.25m.
11) No charge semi-circle have been introduce. The radium of the circles shall be 1.25m frame the point on the floor beneath the exact centre of the inner edge of the semi-circle.

➢ FUNDAMENTAL SKILLS OF BASKETBALL

1. **Handling the ball**
2. **Passing**
   (a) Chest or push pass (b) Baseball pass (c) Underhand
   (d) Overhead pass (e) Two handed bounce pass (f) Hock pass
   (g) Flip pass (h) Tip or valley pass (i) Back pass
3. **Pivoting**

4. **Dribble**
   (a) High dribble (b) Low dribble
5. **Shooting**
   (a) Two hand shot (b) Hook shot
   (c) Lay up shot (d) Jump shot
6. **Rebounding**
7. **Defense**
8. **Dodge**
   (a) To doge with single (b) By speed (c) By escape
9. **Free throw**
10. **Offensive strategy**
    (a) Faking (b) Screening
    (c) Triangular attack (d) Zonal attack
11. **Defensive Attack**
    (a) Blocking (b) Tracking (c) Zonal Defense
    (d) Guarding (e) Man to man defense

➢ BASKETBALL TERMINOLOGY

In order to contribute to basketball conversations, you'll need to learn the language. Below is a list of the most common basketball terms and phrases alongside their definitions.

1) **Assist:** A pass directly leading to a made basket.
2) **Block:** Touching a ball before it reaches the hoop, preventing a made basket.
3) **Center:** Typically the tallest player on the court who plays closest to the basket.
4) **Crossover:** Switching the ball from one hand to the other while dribbling.
5) **Defense:** The team without possession of the ball.
6) **Dribbling:** Bouncing the ball off the floor repeatedly without picking it up.
7) **Field goal:** When the ball goes through the hoop on any shot other than a free throw, worth either two or three points.
8) **Forward:** The 2nd tallest players on the floor after the Center.
9) **Free throw:** A shot awarded after a player is fouled, worth one point.
10) **Guard:** The smaller players on the court who handle the ball most and play away from the basket.
11) **Offense:** The team in possession of the ball.
12) **Pass:** To throw the ball to one's teammates.
13) **Rebound:** To gather the ball after a missed shot.
14) **Shot:** An attempt to throw the ball into the hoop.
15) **Three-point-line:** The semi-circle surrounding the key. Shots made from beyond this line count for three points.

APPLIED METHEMATICS (241)

CHAPTER NO.: 6, 9

GEOMETRIC PROGRESSION

1. If a, b, c are in G.P., then
   (a) $a(b^2+a^2)=c(b^2+c^2)$ (b) $a(b^2+c^2)=c(a^2+b^2)$
   (c) $a^2(b+c)=c^2(a+b)$ (d) None of these
2. 7^{th} term of the sequence $\sqrt{2}, \sqrt{10}, 5\sqrt{2}, \ldots\ldots$ is
   (a) $125\sqrt{10}$ (b) $25\sqrt{2}$
   (c) 125 (d) $125\sqrt{2}$

3. If the $4^{th}, 7^{th}$ and 10^{th} terms of a G.P. be a, b, c respectively, then the relation between a, b, c is

(a) $b = \frac{a+c}{2}$ (b) $a^2 = bc$

(c) $b^2 = ac$ (d) $c^2 = ab$

4. The number which should be added to the numbers 2, 14, 62 so that the resulting numbers may be in G.P., is

(a) 1 (b) 2

(c) 3 (d) 4

5. If $(p+q)^{th}$ term of a G.P. be m and $(p-q)^{th}$ term be n, then the p^{th} term will be

(a) m/n (b) $\sqrt{mn}$

(c) mn (d) 0

6. The terms of a G.P. are positive. If each term is equal to the sum of two terms that follow it, then the common ratio is

(a) $\frac{\sqrt{5}-1}{2}$ (b) $\frac{1-\sqrt{5}}{2}$

(c) 1 (d) $2\sqrt{5}$

7. If $x, 2x+2, 3x+3,$ are in G.P., then the fourth term is

(a) 27 (b) -27

(c) 13.5 (d) -13.5

8. If the ratio of the sum of first three terms and the sum of first six terms of a G.P. be 125 : 152, then the common ratio r is

(a) $\frac{3}{5}$ (b) $\frac{5}{3}$

(c) $\frac{2}{3}$ (d) $\frac{3}{2}$

9. If the p^{th}, q^{th} and r^{th} term of a G.P. are a, b, c respectively, then $a^{q-r} \cdot b^{r-p} \cdot c^{p-q}$ is equal to

(a) 0 (b) 1

(c) abc (d) pqr

10. If a, b, c are p^{th}, q^{th} and r^{th} terms of a G.P., then $\left(\frac{c}{b}\right)^p \left(\frac{b}{a}\right)^r \left(\frac{a}{c}\right)^q$ is equal to

(a) 1 (b) $a^p b^q c^r$

(c) $a^q b^r c^p$ (d) $a^r b^p c^q$

11. If the roots of the cubic equation $ax^3 + bx^2 + cx + d = 0$ are in G.P., then

(a) $c^3 a = b^3 d$ (b) $ca^3 = bd^3$

(c) $a^3 b = c^3 d$ (d) $ab^3 = cd^3$

12. If the n^{th} term of geometric progression $5, -\frac{5}{2}, \frac{5}{4}, -\frac{5}{8}, \ldots$ is $\frac{5}{1024}$, then the value of n is

(a) 11 (b) 10

(c) 9 (d) 4

13. The third term of a G.P. is the square of first term. If the second term is 8, then the 6^{th} term is

(a) 120 (b) 124

(c) 128 (d) 132

14. If the sum of an infinite G.P. be 9 and the sum of first two terms be 5, then the common ratio is
(a) 1/3 (b) 3/2
(c) 3/4 (d) 2/3

15. The sum of 100 terms of the series $.9 + .09 + .009 .....$ will be
(a) $1-\left(\frac{1}{10}\right)^{100}$ (b) $1+\left(\frac{1}{10}\right)^{100}$
(c) $1-\left(\frac{1}{10}\right)^{106}$ (d) $1+\left(\frac{1}{10}\right)^{100}$

16. If the sum of three terms of G.P. is 19 and product is 216, then the common ratio of the series is
(a) $-\frac{3}{2}$ (b) $\frac{3}{2}$
(c) 2 (d) 3

17. If the sum of first 6 term is 9 times to the sum of first 3 terms of the same G.P., then the common ratio of the series will be
(a) -2 (b) 2
(c) 1 (d) 1/2

18. Three numbers are in G.P. such that their sum is 38 and their product is 1728. The greatest number among them is
(a) 18 (b) 16
(c) 14 (d) None of these

19. If n geometric means be inserted between a and b then the n^{th} geometric mean will be
(a) $a\left(\frac{b}{a}\right)^{\frac{n}{n-1}}$ (b) $a\left(\frac{b}{a}\right)^{\frac{n-1}{n}}$
(c) $a\left(\frac{b}{a}\right)^{\frac{n}{n+1}}$ (d) $a\left(\frac{b}{a}\right)^{\frac{1}{n}}$

20. If the geometric mean between a and b is $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$, then the value of n is
(a) 1 (b) –1/2
(c) 1/2 (d) 2

21. If five G.M.'s are inserted between 486 and 2/3 then fourth G.M. will be
(a) 4 (b) 6
(c) 12 (d) – 6

22. The G.M. of roots of the equation $x^2 - 18x + 9 = 0$ is
(a) 3 (b) 4
(c) 2 (d) 1

23. The two geometric means between the number 1 and 64 are
(a) 1 and 64 (b) 4 and 16
(c) 2 and 16 (d) 8 and 16

24. If a, b, c are in G.P., then
(a) a^2, b^2, c^2 are in G.P.
(b) $a^2(b+c), c^2(a+b), b^2(a+c)$ are in G.P.
(c) $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in G.P.
(d) None of the above

25. If x, G_1, G_2, y be the consecutive terms of a G.P., then the value of $G_1 G_2$ will be

(a) $\frac{y}{x}$ (b) $\frac{x}{y}$

(c) xy (d) $\sqrt{xy}$

26. The sum of infinity of a geometric progression is $\frac{4}{3}$ and the first term is $\frac{3}{4}$. The common ratio is

(a) 7/16 (b) 9/16

(c) 1/9 (d) 7/9

27. The sum can be found of a infinite G.P. whose common ratio is r

(a) For all values of r

(b) For only positive value of r

(c) Only for $0 < r < 1$

(d) Only for $-1 < r < 1 (r \neq 0)$

28. If $y = x - x^2 + x^3 - x^4 + ...\infty$, then value of x will be

(a) $y + \frac{1}{y}$ (b) $\frac{y}{1+y}$

(c) $y - \frac{1}{y}$ (d) $\frac{y}{1-y}$

29. If the sum of the series $1 + \frac{2}{x} + \frac{4}{x^2} + \frac{8}{x^3} + ...\infty$ is a finite number, then

(a) $x > 2$ (b) $x > -2$

(c) $x > \frac{1}{2}$ (d) None of these

30. The sum to infinity of the progression $9 - 3 + 1 - \frac{1}{3} + ...$ is

(a) 9 (b) 9/2

(c) 27/4 (d) 15/2

FUNCTIONS

1. The value of b and c for which the identity $f(x+1) - f(x) = 8x + 3$ is satisfied, where $f(x) = bx^2 + cx + d$, are

(a) $b = 2, c = 1$ (b) $b = 4, c = -1$

(c) $b = -1, c = 4$ (d) $b = -1, c = 1$

2. If $f(x) = \frac{x}{x-1}$, then $\frac{f(a)}{f(a+1)} =$

(a) $f(-a)$ (b) $f\left(\frac{1}{a}\right)$

(c) $f(a^2)$ (d) $f\left(\frac{-a}{a-1}\right)$

3. If $f(x) = \frac{x - |x|}{|x|}$, then $f(-1) =$

(a) 1 (b) –2

(c) 0 (d) +2

4. If $f(x) = 4x^3 + 3x^2 + 3x + 4$, then $x^3 f\left(\frac{1}{x}\right)$ is

(a) $f(-x)$ (b) $\frac{1}{f(x)}$

(c) $\left(f\left(\frac{1}{x}\right)\right)^2$ (d) $f(x)$

5. Let $f: R \to R$ be defined by $f(x) = 2x + |x|$, then $f(2x) + f(-x) - f(x) =$

(a) $2x$ (b) $2|x|$

(c) $-2x$ (d) $-2|x|$

6. If $f(x) = \frac{1}{\sqrt{x + 2\sqrt{2x-4}}} + \frac{1}{\sqrt{x - 2\sqrt{2x-4}}}$ for $x > 2$, then $f(11) =$

(a) 7/6 (b) 5/6

(c) 6/7 (d) 5/7

7. Numerical value of the expression $\left| \frac{3x^3 + 1}{2x^2 + 2} \right|$ for $x = -3$ is

(a) 4 (b) 2

(c) 3 (d) 0

8. Domain and range of $f(x) = \frac{|x-3|}{x-3}$ are respectively

(a) $R, [-1, 1]$ (b) $R - \{3\}, \{1, -1\}$

(c) R^+, R (d) None of these

9. If in greatest integer function, the domain is a set of real numbers, then range will be set of

(a) Real numbers (b) Rational numbers

(c) Imaginary numbers (d) Integers

10. If the domain of function $f(x) = x^2 - 6x + 7$ is $(-\infty, \infty)$, then the range of function is

(a) $(-\infty, \infty)$ (b) $[-2, \infty)$

(c) $(-2, 3)$ (d) $(-\infty, -2)$

11. Domain of the function $f(x) = \sqrt{2 - 2x - x^2}$ is

(a) $-\sqrt{3} \le x \le \sqrt{3}$ (b) $-1 - \sqrt{3} \le x \le -1 + \sqrt{3}$

(c) $-2 \le x \le 2$ (d) $-2 + \sqrt{3} \le x \le -2 - \sqrt{3}$

12. Domain of the function $f(x) = \frac{x-3}{(x-1)\sqrt{x^2 - 4}}$ is

(a) (1, 2) (b) $(-\infty, -2) \cup (2, \infty)$

(c) $(-\infty, -2) \cup (1, \infty)$ (d) $(-\infty, \infty) - \{1, \pm 2\}$

13. Domain of the function $\sqrt{2-x} - \frac{1}{\sqrt{9 - x^2}}$ is

(a) (–3, 1) (b) [–3, 1]

(c) (–3, 2] (d) [–3, 1)

14. Domain of the function $\frac{\sqrt{1+x} - \sqrt{1-x}}{x}$ is

(a) (–1, 1) (b) (–1, 1)–{0}

(c) [–1, 1] (d) [–1, 1]–{0}

15. The domain of the function $f(x) = \sqrt{x - x^2} + \sqrt{4 + x} + \sqrt{4 - x}$ is

(a) $[-4, \infty)$ (b) [–4, 4]

(c) [0, 4] (d) [0, 1]

16. The largest possible set of real numbers which can be the domain of $f(x) = \sqrt{1 - \frac{1}{x}}$ is

(a) $(0, 1) \cup (0, \infty)$ (b) $(-1, 0) \cup (1, \infty)$

(c) $(-\infty, -1) \cup (0, \infty)$ (d) $(-\infty, 0) \cup (1, \infty)$

17. Domain of the function $f(x)=\frac{x^2-3x+2}{x^2+x-6}$ is

(a) $\{x : x \in R,\ x \neq 3\}$

(b) $\{x : x \in R,\ x \neq 2\}$

(c) $\{x : x \in R\}$

(d) $\{x : x \in R,\ x \neq 2, x \neq -3\}$

18. Domain of $f(x)=(x^2-1)^{-1/2}$ is

(a) $(-\infty, -1)\cup(1, \infty)$ (b) $(-\infty, -1]\cup(1, \infty)$

(c) $(-\infty, -1]\cup[1, \infty)$ (d) None of these

19. The natural domain of the real valued function defined by $f(x)=\sqrt{x^2-1}+\sqrt{x^2+1}$ is (a)

$1 < x < \infty$ (b) $-\infty < x < \infty$

(c) $-\infty < x < -1$ (d) $(-\infty, \infty)-(-1, 1)$

20. Range of the function $f(x)=\frac{x^2+x+2}{x^2+x+1}; x \in R$ is

(a) $(1, \infty)$ (b) $(1, 11/7]$

(c) $(1, 7/3]$ (d) $(1, 7/5]$

21. The range of the function $f(x)=\frac{x+2}{|x+2|}$ is (a) {0, 1} (b) {–1, 1}

(c) R (d) $R-\{-2\}$

22. Range of $f(x)=\frac{x^2+34x-71}{x^2+2x-7}$ is

(a) [5, 9] (b) $(-\infty, 5]\cup[9, \infty)$

(c) (5, 9) (d) None of these

23. If x is real, then value of the expression $\frac{x^2+14x+9}{x^2+2x+3}$ lies between

(a) 5 and 4 (b) 5 and –4

(c) – 5 and 4 (d) None of these