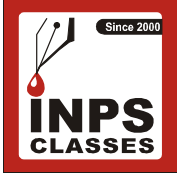# MAH CET 2024 Original Paper

Mathematics
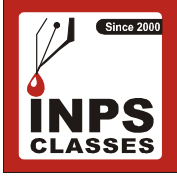
01. The difference between 62% and 80% of a number is 198, then the difference between 92% and 56% of the number will be

(a) 396 (b) 3564 (c) 1100 (d) 1150

02. In a multiple choice questions, there are four alternative answer, of which one or more are correct. A candidate will get marks in the question only if he ticks all the correct answers. The candidate decides to tick answers at random. If he is allowed up to three changes to answer the question, find the probability that he will get marks in the question.

(a) 1/5 (b) 2/4 (c) 10/5 (d) 4/5

03. The domain fo the function $\log f(x) \dfrac{1}{\sqrt{\log_{1/2}\left(x^2 - 7x + 13\right)}}$ is

(a) $3 < x < 4$ (b) $-3 < x < 3$ (c) $-4 < x < 3$ (d) $-2 < x < -1$

04. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. Suppose that tangents at the points B(1, 7) and D(4, –2) on the circle meet at the C. The area of the quadrilateral ABCD is

(a) 75 sq. units (b) 80 sq. units (c) 60 sq. units (d) 50 sq. units

05. Let E^c denote the complement of an event E. Let E, F, G be pairwise independent events with $P(G) > 0$ and $P(E \cap F \cap G) = 0$. The $P\left(E^c \cap F^c \cap | C\right)$ equals

(a) $P(E^c) + P(F^c)$ (b) $P(E^c) - P(F^c)$ (c) $P(E^c) - P(F)$ (d) $P(E) - P(F^c)$

06. Determine the equation of the curve passing through the origin, in the form of y = f(x), which satisfies the differential equation $\dfrac{dy}{dx} = \sin(10x + 6y)$.

(a) $5x + 3y = \left[\tan^{-1}\left(\dfrac{5\tan 4x}{4 - 3\tan 4x}\right) - 5x\right]$

(b) $5x + 3y = \left[\tan^{-1}\left(\dfrac{5\tan 4x}{4 - 3\tan 4x}\right) + 7x\right]$

(c) $5x - 3y = \left[\tan^{-1}\left(\dfrac{5\tan 4x}{4 - 3\tan 4x}\right) - 8x\right]$

(d) $9x + 7y = \left[\tan^{-1}\left(\dfrac{5\tan 4x}{4 - 3\tan 4x}\right) - 5x\right]$

07. Two trains, one of length 210 m and 250 m are running on parallel tracks in opposite directions with speeds 130 km/hr and 110 km/hr. How long will it take for them to cross other completely?

(a) 6.9 seconds (b) 6.1 seconds (c) 6.3 seconds (d) 6.6 seconds

08. The equation of curves through the point (1, 0) and whose slope is $\dfrac{y - 1}{x^2 + x}$ is

(a) $(y - 1)(x + 1) + 2x = 0$ (b) $2x(y - 1) + x + 1 = 0$

(c) $x(y - 1)(x + 1) + 2 = 0$ (d) $(y - 1)(2x + 1) + 2x = 0$
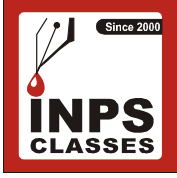
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09. At 3 : 40, the hour and minute hands of a clock are inclined at

(a) $\dfrac{2\pi^c}{3}$ (b) $\dfrac{7\pi^c}{12}$ (c) $\dfrac{13\pi_c}{18}$ (d) $\dfrac{3\pi_c}{3}$

10. The range of the function $\log \sin f(x) = \log_{[x-1]} \sin x$ is

(a) $(-\infty, 0]$ (b) $(-\infty, \infty)$ (c) $(0, 1]$ (d) $(1, -\infty]$

11. Suppose two cards are drawn at random from a deck of cards, Let X be the number of aces obtained. Then the value of E(X) is

(a) 27/221   (b) 5/13   (c) 1/3   (d) 2/13

12. The degree of the differential equation satisfying $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$ is

(a) 1   (b) 2   (c) 3   (d) 4

13. If ends of base of an isosceles triangle are at (2, 0) and (0, 1) and the equation of one side is x = 2, then the orthocentre of the triangle is

(a) (3/2, (3/2)   (b) (5/4, 1)   (c) (3/4, 1)   (d) (4/3, 7/12)

14. The total number of positive integral solution of $15 < x_1 + x_2 + x_3 \le 20$ is equal to

(a) 685   (b) 785   (c) 1125   (d) 1730

15. Which of the following is periodic?

(a) f(x) = x – [x] where [x] denotes the largest integer less than or equal to the real number x.

(b) $f(x) = \sin \dfrac{1}{x}$ for $x \ne 0, f(0) = 0$

(c) f(x) = x cos x

(d) $f(x) = x \cos \dfrac{1}{x}$

16. A spherical ball of diameter 21 cm is melted and recast into cubes, each of side 1 cm. The number of cubes thus formed are

(a) 4851   (b) 4850   (c) 8451   (d) 5841

17. If the Probability Density Function of a continuous random variable X is $\begin{array}{l} f(x) = \dfrac{x+2}{18}, \quad -2 < x < 4 \\ = 0, \qquad\qquad \text{otherwise} \end{array}$. Then

$P(|X| < 1)$ is

(a) 1/9   (b) 2/9   (c) 3/9   (d) 4/9

18. An experiement has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment. If A consists of 4 outcomes, the number of outcomes that B must have so that A and B are independent, is:

(a) 2, 4 or 8 (b) 3, 6 or 9 (c) 4 or 8 (d) 5 or 10

19. Let $a_1, a_2, ..., a_{15}$ be in an arithmetic progression. $a_1 + a_2 + ... + a_{10} = A$ and $a_6 + a_7 + ... + a_{15} = B$. If $B - A = 200$ and $B + A = 860$, then the value of a_{15} is

(a) 72 (b) 51 (c) 71 (d) 61

20. The acute angle between the lines $x - 2y + 3 = 0$ and $3x + y - 1 = 0$ is

(a) $\tan^{-1}(7)$ (b) $\sin(10)$ (c) $\cos^{-1}(5)$ (d) $\sin(10)$

21. The locus of a point whose distance from (a, 0) is equal to its distance from y-axis, is

(a) $y^2 - 2ax + a^2 = 0$ (b) $y - 2ax + a^2 = 0$ (c) $y^2 + 2ax + a^2 = 0$ (d) $y^2 - 2ax + a = 0$

22. Cumulative Density Function F(x) of a continuous random variable X is defined as:

(a) $F(x) = \int_{-\infty}^{x} f(x)dx$ (b) $F(x) = \int_{1}^{x} f(x)dx$ (c) $F(x) = \int_{-\infty}^{\infty} f(x)dx$ (d) $F(x) = P[X = x]$

23. The domain of the function $f(x) = \dfrac{\sqrt{(x+1)(x-3)}}{x-2}$ is

(a) $[-1, 2) \cup [3, \infty)$ (b) $[-1, -2) \cup [3, \infty)$ (c) $[-1, 2) \cup [-3, \infty)$ (d) $[-1, -2) \cup [-3, \infty)$

24. Rohan finishes a journey by scooter in 5 hours. He travels the first half of the journey at 30 km/h and the second half of the journey at 20 km/hr. The distance covered by him is:

(a) 130 km (b) 120 km (c) 140 km (d) 100 km

25. P can complete a work in 8 hours and Q can complete a work in 12 hours. If the work starts at 9:00 am by P and P and Q work at alternate hours, find at what time the work will be finished?

(a) 6:00 pm (b) 6:30 pm (c) 5:00 pm (d) 5:30 pm

26. The radii of two circles are 19 cm and 9 cm respectively. The radius of the circle which has circumference equal to the sum of the circumference of two circle is

(a) 35 cm (b) 10 cm (c) 21 cm (d) 28 cm

27. If the coefficient of 4th term in the expansion of $(a + b)^n$ is 56, then the value of n is:

(a) 5 (b) 7 (c) 8 (d) 4

28. Which one of the following is not a function:

(a) $\{(x, y) : x, y \in R, x^2 = y\}$ (b) $\{(x, y) : x, y \in R, y^2 = x\}$

(c) $\{(x, y) : x, y \in R, x = y^3\}$ (d) $\{(x, y) : x, y \in R, y = x^3\}$
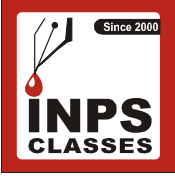
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29. If the co-ordinates of the two points A and B are (3, 4) and (5, –2), respectively. The co-ordinates of any point P if PA = PB and area of $\Delta PAB = 10$ sq. units are.

(a) (7, 2) or (1, 0)   (b) (2, 7) or (–1, –1)   (c) (–1, 0) or (2, –9)   (d) (2, 10) or (3, 5)

30. If 10^m divides the number $101^{100} - 1$, then the greatest value of m is

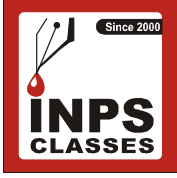(a) 1   (b) 2   (c) 3   (d) 4

Logical Abstract

01. For the given number series, find what will come in place of the question mark (?)

15, 15, 19, 28, ?, 105

(a) 45   (b) 48   (c) 47   (d) 44

02. Rohit introduces Ravi as the son of the only brother of his father's wife. How is ravi related to Rohit?

(a) Son   (b) Uncle   (c) Cousin   (d) Brother

03. Glass is to water as cup is to ....?

(a) Dish   (b) Coffee   (c) Spoon   (d) Food

04. If E = 5 and HOTEL = 12, how will you code LAMB?

(a) 10   (b) 26   (c) 7   (d) 28

05. Which word does not belong with the others?

(a) steering wheel   (b) tyre   (c) engine   (d) car

06. The missing term in the series: 1, 4, 27, 16, 125, ?, 343, ... is

(a) 6   (b) 36   (c) 216   (d) 150

07. There are five boys Prem, Raju, Sundar, Hari and Yash. Raju has more share of land than Sundar but lesser than Prem. Yash has the least share of Hari has lesser share than Shundar. Who owns the highest share of land?

(a) Sundar   (b) Prem   (c) Raju   (d) Hari

08. From her house, Archana went 15 km to the North. Then she turned to her left and covered 10 km. Then she turned south and covered 5 km. Finally, turning to her left, she covered 10 km. In which direction is she from her house?

(a) North   (b) South   (c) North west   (d) North east

09. For the given number series, find what will come in place of the question mark (?)

5, 5, 7.5, ?, 37.5, 112.5

(a) 17   (b) 10.5   (c) 15   (d) 15.5

10. Complete the series: 1, 7, 15, 25, 37, ...

(a) 46   (b) 48   (c) 49   (d) 51

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11. Choose the one option which is different from other three options.

(a) Microwave   (b) Printer   (c) Scanner   (d) Photocopier

12. If 7 spiders make 7 webs in 7 days, then 1 spier will make 1 web in how many days?

(a) 7/2   (b) 1   (c) 7   (d) 49

13. Look at this series: E2, _____, G8, H16, I32, ... What number should fill the blank?

(a) A16   (b) J4   (c) F4   (D) D3

14. In a certain code language, BEAT is written as YVZG, then what will be the code of MILD?

(a) ONRW   (b) NOWR   (c) ONWR   (d) NROW

15. A parking lot contains 160 vehicles. Each vehicles is either a car or a truck, and each vehicle is either red or green. 70 vehicles are red and 120 vehicles are cars. If there are 18 green trucks, how many red cars are there?

(a) 54   (b) 50   (c) 48   (d) 45

16. While going to office, Shriram travesl at a speed of 20 kmph and on his way back, he travels at a speed of 35 kmph. What is his average speed of the whole journey?

(a) 25.4 kmph   (b) 26.4 kmph   (c) 32 kmph   (d) 46 kmph

17. Choose odd one out of the given alternatives?

(a) Write   (b) Knowledge   (c) Read   (d) Learn

18. Introducing a woman, Rahul said, "She is the mother of the only daughter of my son". How that woman is related to Rahul?

(a) Daughter   (b) Sister - in - law   (c) Wife   (d) Daughter-in-law

19. A, P, R, X, S and Z are sitting in a row. S and Z are in the centre. A and P are at the ends. R is sitting to the left of A. Who is to the left of X?

(a) R   (b) S   (c) P   (d) Z

20. If 'white' is blue, 'blue' is 'red', 'red' is 'black' and 'black' is 'green' then what would be the colour of the human blood?

(a) Blue   (b) Green   (c) Red   (d) Black

21. If the total ages of Vina and Shekhar is 15 years more than the total age of Shekhar and Charu. Charu is how many years younger than Vina?

(a) 13   (b) 11   (c) 15   (d) None of the above

22. In a certain code language:
'blue is pale' is written as 'tr mn jo'.
'red but blue' is written as 'ce bd tr'
'apple is red' is written as 'bd gf mn',
What is the code of 'blue' in the given code language

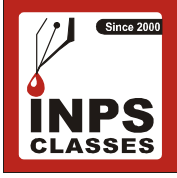(a) bd   (b) jo   (c) tr   (d) mn

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23. Catching the earlier train will give us the _____ to do some shopping.

(a) chance   (b) occasion   (c) luck   (d) possibility

24. Vicky is son of Shrikant's father sister. Swarup is the son of Divya who is the mother of Gaurav and grandmother of shrikant. Ashok is the father of Tina and grandfather of Vicky. Divya is the wife of Ashok. How is Gaurav's wife related to Tina?

(a) Niece   (b) Sister   (c) Sister-in-law   (d) Mother

25. Look at this series: J14, L16, _____, P20, R22, ... What number should fill the blank?

(a) S24   (b) N18   (c) M18   (d) T24

26. Which one of the our choices makes the best comparison?

REACH is to HCAER as 47251 is to:

(a) 27451   (b) 72451   (c) 51472   (d) 15274

27. Rohit and Tina are standing at two ends of a room with a width of 30 m. They start walking towards each other along the width of the room with a speed of 2m/s and 1m/s, respectively. Find the total distance travelled by Rohit when he meets Tina for the third time.

(a) 110 m   (b) 100 m   (c) 120 m   (d) 112 m

28. Choose the figure which is different from the rest.

(a) 1   (b) 2   (c) 3   (d) 4

29. Pointing to a photograph of a girl Mr. Ram said, "She is the daughter of the only son of my mother". How is Mr. Ram related to that girl?

(a) Uncle   (b) Brother   (c) Father   (d) Cousin

30. In a row of trees, a tree is 8th from left and 14th from right end. How many trees are there in the row?

(a) 21   (b) 22   (c) 20   (d) 23

English Comprehension

01. Read the paragraph and answer the question:

The sky was dark, and thunder echoed in the distance. People hurriedly closed windows, anticipating a heavy rain.

What is the likely weather condition?

(a) Sunny   (b) Snowy   (c) Rainy   (d) Windy

02. Choose the correct meaning of the word "vicissitude."

(a) Stability   (b) Changeable circumstances   (c) Predictability   (d) Consistency
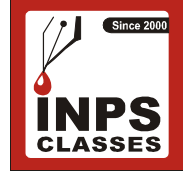
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03. What is the antonym of "mellifluous"?

(a) Discordant   (b) Harmonious   (c) Melodious   (d) Dulcet

04. What does the phrase "beyond the pale" means?

(a) Unacceptable or outside the bounds of decency   (b) Within the acceptable limits

(c) A pale - coloured boundary   (d) Beyond the scope of understanding

05. Identify the incorrect word:

(a) Conscious   (b) Conscience   (c) Consciensious   (d) Consequence

06. Arrange the following sentences into a coherent paragraph:

A.   Despite the challenges, the team persevered.

B.   In the end, their hard work paid off.

C.   First, they faced unexpected setbacks.

D.   Then, a strategic plan was devised.

(a) C, D, A, B   (b) B, C, A, D   (c) C, D, B, A   (d) B, C, D, A

07. In the context of the sentence, what does the word "Mitigate" mean? The new policies are expected to mitigate the impact of climate change.

(a) Worsen   (b) Reduce   (c) Ignore   (d) Exacerbate

08. Choose the synonym for "ubiquitous".

(a) Rare   (b) Abundant   (c) Elusive   (d) Scarce

09. Read the statement and answer the question:
Statement: All birds can fly.
Question: Can penguins fly?
(a) Yes, because they are birds   (b) No, because they are birds.
(c) Yes, but only some penguins can fly   (d) No, because penguins cannot fly.

10. Complete the sentence: The successful negotiation resulted from their _____ approach.

(a) Amicable   (b) Contentious   (c) Confrontational   (d) Compromising

11. Identify the sentence in the active voice:

(a) The book was read by Mary   (b) Mary read the book.

(c) The book had been read Mary   (d) The book will be read by Mary.

12. Read the passage and answer the question:
The sunflower follows the sun throughout the day, a behavior known as heliotropism. What is the reason for the movement?
(a) To avoid predators   (b) To absorb more sunlight for photosynthesis
(c) To attract pollinators   (d) For aesthetic purposes
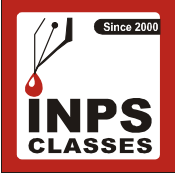
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13. Identify the correct sentence:

(a) I don't know who you are?

(b) Whom you are, I don't know.

(c) I don't know who are you.

(d) I don't know who you are.

14. Identify the sentence with the correct word usage:

(a) The dessert was complimented with a dollop of whipped cream.

(b) The dessert was complemented with a dollop of whipped cream.

(c) The dessert was completed with a dollop of whipped cream.

(d) The dessert was comprised with a dollop of whipped cream.

15. Arrange the following sentence to form a coherent paragraph:

1.   She went to the store.

2.   After finishing her homework.

3.   To buy some groceries.

4.   Mary decided.

Choose the correct answer from the options given below:

(a) 4, 2, 1, 3   (b) 2, 4, 3, 1   (c) 4, 1, 2, 3   (d) 2, 4, 1, 3

16. Choose the correct idiom:

He decided to pay it by _____.

(a) Year   (b) Ear   (c) Here   (d) Fear

17. Identify the sentence with the correct punctuation:

(a) I visited Paris France in the summer.

(b) I visited Paris, France, in the summer.

(c) I visited Paris, France in the summer

(d) I visited Paris France, in the summer.

18. Complete the analogy: Clock is to time as thermometer is to _____.

(a) Temperature   (b) Weather   (c) Season   (d) Clock

19. Improve the sentence.

The concert was so good, it made me to cry.

(a) it made me to cry   (b) it made me cry   (c) making me cry   (d) it makes me cry

20. Choose the antonym for "Voracious".

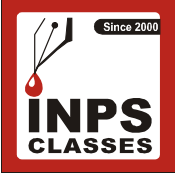(a) Hungry   (b) Insatiable   (c) Moderate   (d) Starving

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Computer Concepts

01. The clarity of an image on the screen, measure in pixels. The higher _____, the more pixels and clear the image.

(a) Resources   (b) Resolution   (c) Byte   (d) Pixels

02. A _____ contains a list of commands from which a user can make selections.

(a) File   (b) Icon   (c) Window   (d) Menu

03. The portion of the process scheduler in an operating system that dispatches processes is concerned with _____.

(a) assigning ready processes to waiting queue   (b) assigning running processes to blocked queue

(c) assigning ready processes to CPU   (d) assigning ready processes to blocked queue

04. One of the most negative impact to computer technology is _____.

(a) the interruptions by telephone calls and email by individual staff.

(b) wasted man hours.

(c) the technical problems hitches or interruptions that bring the whole workplace to a grinding halt.

(d) staff absent from the workplace.

05. Perform Two's complement addition of two negative numbers $(11101)_2$ and $(11110)_2$.

(a) 00101   (b) 11011   (c) 00000   (d) 11111

06. Convert 01101_2 to octal.

(a) 15_8 (b) 13_8 (c) 12_8 (d) 16_8

07. One million cycles per second is

(a) Server   (b) Program   (c) Gigahertz   (d) Megahertz

08. Which of the following terms represent the raw, unorganized and meaningless facts that are inputted to a computer.

(a) Information   (b) Instructions   (c) Data   (d) Work Orders

09. _____ helps employees use computer technology to work from home or during business travel and are linked by the network to the office.

(a) Hacker   (b) Spyware   (c) Telecommuting   (d) Server

10. 1000 MB or 1 billion bytes is what?

(a) Kilobyte   (b) Gigabyte   (c) Megabyte   (d) Terabyte

11. A hacker that changes or forges information in an electronic resource, is engaging in _____.

(a) denial of service   (b) sniffing   (c) terrorism   (d) data diddling

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12. Predict the output of the following C code:

```
int x = 0;
int f()
{
int g()
{
int x = 1;
return f();
}
int main()
{
printf("%d", g());
printf("/n");
getchar();
}
```

(a) 1   (b) 0   (c) Garbage value   (d) 2

13. Number of bits in ALU is _____.

(a) 4   (b) 8   (c) 16   (d) 2

14. A small lighweight computer that includes monitor, keyboard, hard disk drive, CD/DVD storage drives, and a pointing device as one unit that folds for easy portability is

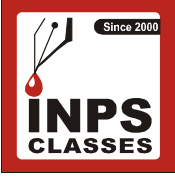(a) Laptop   (b) Desktop   (c) PSP   (d) Nintendo DS

15. Predict the output of the below C program.

```
#include
int main()
{
static int t=5;
if (- - i){
main();
printf("%d", i);
}
}
```

(a) segmentation fault (core dumped)   (b) 1 2 3 4   (c) 0 0 0 0   (d) 4 3 2 1

16. Represent the given number in the IEEE Standard 754 single preision floating point format
85.125
(a) 0 10000101 01010100100000000000000   (b) 0 01111101 01010100100000000000000
(c) 0 01111111 01010100100000000000000   (d) 1 10000101 01010100100000000000000
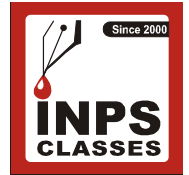
17. What are the positive and negative ranges of number using 12 bits two's complement notation?

(a) -2^{11} to $+2^{11} - 1$ (b) -2^{12} to $+2^{12} - 1$ (c) -2^{11} to $+2^{11} - 2$ (d) $-2^{11} - 1$ to $+2^{11}$

18. Find the equivalent octal form of $C1_{16}$.

(a) 301_8 (b) 193_8 (c) 201_8 (d) 302_8

19. Located insie the system unit, a circuit board where the computer memory, power supply, the processor, and other vital electornic parts are housed.

(a) DVD drive (b) Zip drive (c) Motherboard (d) Hardware

20. The address of a page table in memory is pointed by _____.

(a) stack pointer (b) pge table base register (c) page register (d) program counter.

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Answer Key

Mathematics

01. (a) **02.** (a) **03.** (a) **04.** (a) **05.** (c) **06.** (a) **07.** (a) **08.** (a) **09.** (c) **10.** (a) **11.** (d) **12.** (a) **13.** (b) **14.** (a)

15. (a) **16.** (a) **17.** (b) **18.** (d) **19.** (c) **20.** (a) **21.** (a) **22.** (a) **23.** (a) **24.** (b) **25.** (b) **26.** (d) **27.** (c) **28.** (b)

29. (a) **30.** (d)

Logical Abstract

01. (d) **02.** (c) **03.** (b) **04.** (c) **05.** (d) **06.** (b) **07.** (b) **08.** (a) **09.** (c) **10.** (d) **11.** (a) **12.** (c) **13.** (c) **14.** (d)

15. (c) **16.** (a) **17.** (b) **18.** (d) **19.** (c) **20.** (d) **21.** (c) **22.** (c) **23.** (a) **24.** (c) **25.** (b) **26.** (d) **27.** (b) **28.** (d)

29. (c) **30.** (a)

English Comprehension

01. (c) **02.** (b) **03.** (d) **04.** (a) **05.** (c) **06.** (a) **07.** (b) **08.** (b) **09.** (d) **10.** (a) **11.** (b) **12.** (b) **13.** (d) **14.** (a)

15. (b) **16.** (b) **17.** (b) **18.** (a) **19.** (b) **20.** (c)

Computer Concepts

01. (b) **02.** (d) **03.** (c) **04.** (c) **05.** (b) **06.** (a) **07.** (d) **08.** (c) **09.** (c) **10.** (b) **11.** (d) **12.** (b) **13.** (c) **14.** (a)

15. (a) **16.** (a) **17.** (a) **18.** (a) **19.** (c) **20.** (b)