**Department of Biomedical Engineering**

**Faculty of Engineering and Applied Sciences**

**Riphah International University, Islamabad**

**Sample Entry Test**

 **MS Biomedical Engineering Program**

**Time Allowed: 1 Hour**

**Instructions:**

Please write the following **Exam ID** on your **Answer Sheet**.

**19002**

* Calculators or any other electronic gadgets are not allowed.
* For each problem chose the correct option and blacken the corresponding choice on your answer sheet.
* You may use any blank space on the page for your work.
* No student can leave the examination hall till half time of the test.
* Before leaving the exam hall please return the Question Book.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Title** | **No. of Questions** | **Marks** |
| A | English | 20 | 20 |
| B | Quantitative  | 20 | 20 |
| C | Analytical | 20 | 20 |
| **Total** | **60** | **60** |

**SECTION A - English**

**20 Questions**

**Each question below consists of a related pair of words, followed by five lettered pairs of words. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.**

1. [DETERIORATE](http://www.sheir.org/vocabulary.html#deteriorate) : IMPROVE
	1. [feckless](http://www.sheir.org/vocabulary.html#feckless) : careless
	2. [evanescent](http://www.sheir.org/vocabulary.html#evanescent) : [exigent](http://www.sheir.org/vocabulary.html#exigent)
	3. hope : [hone](http://www.sheir.org/vocabulary.html#hone)
	4. [accumulation](http://www.sheir.org/vocabulary.html#accumulation) : [narrate](http://www.sheir.org/vocabulary.html#narrate)
	5. [obstinate](http://www.sheir.org/vocabulary.html#obstinate) : [tractable](http://www.sheir.org/vocabulary.html#tractable)
2. [AGGRAVATE](http://www.sheir.org/vocabulary.html#aggravate) : [ALLEVIATE](http://www.sheir.org/vocabulary.html#alleviate)
	1. [later](http://www.sheir.org/vocabulary.html#later) : [precede](http://www.sheir.org/vocabulary.html#precede)
	2. [urbane](http://www.sheir.org/vocabulary.html#urbane) : [naive](http://www.sheir.org/vocabulary.html#naive)
	3. [evasive](http://www.sheir.org/vocabulary.html#evasive) : wordy
	4. [feeble](http://www.sheir.org/vocabulary.html#feeble) : worker
	5. [disavow](http://www.sheir.org/vocabulary.html#disavow) : [confront](http://www.sheir.org/vocabulary.html#confront)
3. [VINDICTIVE](http://www.sheir.org/vocabulary.html#vindictive): [MERCY](http://www.sheir.org/vocabulary.html#mercy)
	1. [transient](http://www.sheir.org/vocabulary.html#transient) : [fleeting](http://www.sheir.org/vocabulary.html#fleeting)
	2. [elated](http://www.sheir.org/vocabulary.html#elated) : happy
	3. [crestfallen](http://www.sheir.org/vocabulary.html#crestfallen) : [cognizant](http://www.sheir.org/vocabulary.html#cognizant)
	4. [cajole](http://www.sheir.org/vocabulary.html#cajole) : [coax](http://www.sheir.org/vocabulary.html#coax)
	5. [skeptical](http://www.sheir.org/vocabulary.html#skeptical) : trustfulness
4. ISLAND : [ARCHIPELAGO](http://www.sheir.org/vocabulary.html#archipelago)
	1. classroom : school
	2. student : teacher
	3. [brook](http://www.sheir.org/vocabulary.html#brook) : building
	4. [chary](http://www.sheir.org/vocabulary.html#chary) : [cautious](http://www.sheir.org/vocabulary.html#cautious)
	5. transport : transfer

**Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.**

1. [FOE](http://www.sheir.org/vocabulary.html#foe)
	1. Friend
	2. Enemy
	3. Foul
	4. Fail
	5. Fraud
2. [CONSENSUS](http://www.sheir.org/vocabulary.html#consensus)
	1. Agreement
	2. Disagreement
	3. Quality
	4. Special case
	5. Bold
3. [FECKLESS](http://www.sheir.org/vocabulary.html#feckless)
	1. Weak
	2. Careful
	3. Careless
	4. Unlucky
	5. None of these
4. [MELANCHOLY](http://www.sheir.org/vocabulary.html#melancholy)
	1. Sorrowful
	2. Happy
	3. Confused
	4. Convicted
	5. None of these

**Complete the sentences by choosing the most appropriate word(s), from the given choices below.**

1. I can \_\_\_\_\_\_\_\_\_\_ for his honesty and ability to work hard.
	1. bet
	2. promise
	3. [vouch](http://www.sheir.org/vocabulary.html#vouch)
	4. [vow](http://www.sheir.org/vocabulary.html#vow)
	5. None of these
2. Job in this department \_\_\_\_\_\_\_\_\_\_ a lot of hard work.
	1. mean
	2. means
	3. [entails](http://www.sheir.org/vocabulary.html#entail)
	4. [curtail](http://www.sheir.org/vocabulary.html#curtail)
	5. None of these
3. I cannot concentrate, here is too much \_\_\_\_\_\_\_\_\_\_.
	1. [detraction](http://www.sheir.org/vocabulary.html#detraction)
	2. [distraction](http://www.sheir.org/vocabulary.html#distraction)
	3. people
	4. sound
	5. [contraction](http://www.sheir.org/vocabulary.html#contraction)
4. This account is exempted from \_\_\_\_\_\_\_\_\_\_ charges.
	1. tax
	2. [bevy](http://www.sheir.org/vocabulary.html#bevy)
	3. [levy](http://www.sheir.org/vocabulary.html#levy)
	4. interest
	5. taxation

**Questions 13-17 are based on the following passage.**

Unemployment is an important index of economic slack and lost output, but it is much more than that. For the unemployed person, it is often a damaging affront to human dignity and sometimes a catastrophic blow to family life. Nor is this cost distributed in proportion to ability to bear it. It falls most heavily on the young, the semiskilled and unskilled, the black person, the older worker, and underemployed person in a low income rural area who is denied the option of securing more rewarding urban employment…. The concentrated incidence of unemployment among specific groups in the population means far greater costs to society that can be measured simply in hours of involuntary idleness or dollars of income lost. The extra costs include disruption of the careers of young people, increased juvenile delinquency, and perpetuation of conditions which breed racial discrimination in employment and otherwise deny equality of opportunity. There is another and more subtle cost. The social and economic strains of prolonged underutilization create strong pressures for cost-increasing solutions…. On the side of labor, prolonged high unemployment leads to “share-the-work” pressures for shorter hours, intensifies resistance to technological change and to rationalization of work rules. On the side of business, the weakness of markets leads to attempts to raise prices to cover high average overhead casts and to pressures for protection against foreign and domestic competition.

1. According to the passage, unemployment is an index of
	1. over utilization of capacity
	2. economic slack and lost output
	3. diminished resources
	4. the employment rate
	5. under capacity
2. While unemployment is damaging to many, it falls most heavily upon all except the
	1. black
	2. semiskilled
	3. unskilled
	4. underemployed
	5. white middle class
3. The cost to society of unemployment can be measured by all except
	1. lost incomes
	2. idleness
	3. juvenile delinquency
	4. disruption of careers
	5. the death rate
4. Serious unemployment leads labor groups to demand
	1. more jobs by having everyone work shorter hours
	2. higher wages to those employed
	3. “no fire” policies
	4. cost-cutting solutions
	5. higher social security payments
5. According to the passage, a typical business reaction to a recession is to press for
	1. higher unemployment insurance
	2. protection against imports
	3. government action
	4. restrictive business practice
	5. restraint against union activity

**Choose the lettered word or phrase that is most nearly same in meaning to the word in capital letters.**

1. [ABSTRUSE](http://www.sheir.org/vocabulary.html#abstruse)
	1. Showy
	2. Evident
	3. To prove something
	4. Skillful
	5. [Concealed](http://www.sheir.org/vocabulary.html#concealed)
2. [VACOUS](http://www.sheir.org/vocabulary.html#vacous)
	1. Stupid
	2. Truthfulness
	3. [Ravenous](http://www.sheir.org/vocabulary.html#ravenous)
	4. Dreamer
	5. Confused
3. [PRAGMATIC](http://www.sheir.org/vocabulary.html#pragmatic)
	1. Practical
	2. Magnetic
	3. Liar
	4. [Arrogant](http://www.sheir.org/vocabulary.html#arrogant)
	5. Uncertain

 **End of Section A**

**SECTION B - Quantitative**

**20 Questions**

1. A rectangular tiled floor is composed of 70 square tiles. The rectangular floor is rearranged so that 2 tiles are removed from each column and 4 tiles are added to each row. After the change in layout, the floor will still have 70 tiles, and still be rectangular. How many columns are in the tile floor before the change inlayout?
2. 4
3. 6
4. 10
5. 14
6. 28
7. City *B* is 4 miles due east of city *A*. City *C* is 3 miles due south of city *B*. City *D* is 4 miles due east of city *C*, and city *E* is 9 miles due north of city *D*. What is the distance between city *A* and city*E*?
8. 10miles
9. 20miles
10. 24 miles
11. 30 miles
12. 42miles
13. Of the 150 players in a baseball league, 90 are left-handed. Which of the following is the percentage of players that are notleft-handed?

A.38%

B.44%

C.42%

D.40%

E.56%

1. A car travels at a rate of 55 mph for the first 4 hours of a trip. The car then travels 70 mph for each additional hour of the trip. The average speed of the entire trip was 60 mph. How long was thetrip?
2. 6 hours
3. 8 hours
4. 11 hours
5. 12 hours
6. 14 hours
7. An Olympic diver received the following scores: 6.0, 7.0, 7.5, 6.5 and 8.0. The standard deviation of these scores is in which of the followingranges?

A. 4 –6.9

B. 2 –3.9

C. 0 –1.9

D. 7 –7.9

E. 8 –9.9

1. Jack and Kevin play in a basketball game. If the ratio of points scored by Jack to points scored by Kevin is 3 to 5, which of the following could NOT be the total number of points scored by the twoboys?
2. 8
3. 17
4. 16
5. 24
6. 40
7. A salesman's income consists of commission and base salary. His weekly income totals over the past 5 weeks have been $360, $390, $430, $415 and $450. What must his average income over the next two weeks be to increase his average weekly income to $460 over the 7-week period?

A. $570

B.$587.50

C.$557.50

D.$586

E.$615

1. A fish tank is one-fourth full of water. If six gallons of water were added, the tank would be three-fourths full. What is the capacity of the tank (ingallons)?
2. 10
3. 14
4. 18
5. 12
6. 8
7. The value of a cellular phone declines by 33 percent of its current value every year. At this rate,approximatelyhowmanyyearswillittakesforthepriceofa$243cellphonetoreach$72?

A. 2.5

1. 2
2. 3
3. 13

E. 13.5

1. If a certain factory produces 24 Pepsi bottles of one liter capacity each in 12 minutes, approximately how many Pepsi bottles does it produce in onehour?

A.110

B.120

C.124

D.140

E.100

1. The deadline for an assignment was Sunday, January 27. The deadline was then extended for 15 days. What day of the week is newdeadline?
2. Monday
3. Tuesday
4. Wednesday
5. Thursday
6. Friday
7. Dean’s Department Store reduces the price of a $40 shirt by 15%, but later raises it again by 20% of the sale price. What is the final price of theshirt?

A. $44.40

B.$42

C.$40

D.$40.80

E.$40.60

1. The average weekly salary of 12 workers and 3 managers in a factory was $600. A manager whose salary was $720 was replaced with a new manager, then the average salary of the team fell to $580. What is the salary of the newmanager?

A.$570

B.$690

C. $640

D. $420

E.$560

1. Tomtakesexactly30minutestorakealawnandhissonMiketakesexactly60minutesto rake the same lawn. If Tom and Mike decide to rake the lawn together, and both work at the same rate that they did previously, how many minutes will it take them rake thelawn?
2. 16
3. 20
4. 36
5. 45
6. 90
7. If the average (arithmetic mean) of **3a** and **4b** is less than 50, and **a** is twice **b**, what is the largest integer value of **a**?
8. 9
9. 10
10. 11
11. 19
12. 20
13. Consider the following equation. Solve for :

1. none of the above
2. An employee's annual salary was increased $15,000. If her new annual salary now equals $90,000, what was the percent increase?
3. 15%
4. 16%
5. 20%
6. 22%
7. 24%
8. TLRIA is related to WOULD in the same way as YBVLKA is related to:
9. MATTER
10. BEFORE
11. BEYOND
12. NORMAL
13. none of the above
14. Consider the larger circle and an inner circle. Point *A* is center of larger circle. If the line AB (not drawn) is 7 cm in length, then find the area of larger circle.
15. 94 cm

1. 112 cm
2. 136 cm
3. 154 cm
4. none of the above
5. The value of y in the given triangle is?

1. 16

1. 32
2. none of the above

**End of Section B**

**SECTION C - Analytical**

**20 Questions**

**For question 41 to 42**

There are seven cages next to each other in a zoo. The following is known about the cages. Each cage has only one animal, which is either a monkey or a bear. There is a monkey in each of the first and last cages. The cage in the middle has a bear. No two adjacent cages have bears in them. The bear’s cage in the middle has two monkey cages on either side. Each of the two other bear cages are between and next to two monkeycages

1. How many cages have monkeys inthem?

A: 2

B: 3

C: 4

D:5

E: 6

1. The bear cage in the middle must have

A: No other bear cage to itsleft

B: No monkey cage on its right.

C: A bear cage to its left and to its right

D: Other bear cages next to it.

E: No monkey cage to its left.

**For question 43 to 45**

A nursery class in a school has a circular table with eleven seats around it. Five girls (Kiran, Lado, Maryam, Omera and Parveen) and five boys (Farhan, Ghaus, Haris, Imdad and Jahangir) are seated around the table. None of the girls are seated in a seat adjacent to another girl. Kiran sits between Farhan and Ghaus, and next to each of them. Jahangir does not sit next toImdad.

1. Which of the following is a possible seating order around thetable?

A: Empty seat, Farhan, Kiran, Ghaus, Lado, Omera, Haris, Imdad, Parveen, Jahangir, and Maryam.

B: Empty seat, Farhan, Kiran, Ghaus, Lado, Jahangir, Parveen, Omera, Imdad, Maryam, Haris.

C: Empty seat, Farhan, kiran, Ghaus, Omera, Jahangir, Parveen, Imdad, Maryam, Haris, Lado.

D: Empty seat, Omera, Farhan, Kiran, Ghaus, Lado, Jahangir, Imdad, Parveen, Haris, Maryam.

E: Empty seat, Maryam, Farhan, Kiran, Ghaus, Lado, Jahangir, Perveen, Imdad, Omera, Haris.

1. If Lado, Haris, Maryam, Jahangir, and Ghaus are seated in that order, which of the following is a correct completion of the seating order afterGhaus?

A : Kiran, Farhan, Omera, Imdad, Parveen, empty seat.

 B : Kiran, Farhan, Imdad, Omera, empty seat, Parveen

 C : Farhan, Parveen, Kiran, Imdad, Omera, empty seat.

 D : Kiran, Farhan, Parveen, Imdad, empty seat, Omera.

 E : Kiran, Farhan, Omera, empty seats, Parveen,Imdad.

1. If Jahangir leaves his seat and occupies the empty seat, his new seating position would bebetween:

A : Farhan and Kiran

B : Maryam and Ghaus

 C : Kiran and Ghaus

D : Imdad and Lado

 E : Parveen andLado

**For question 46 to 48**

A volunteer uses a truck to pick up donations of unsold food and clothing from stores and to deliver them to locations where they can be distributed. He drives only along a certain network of roads. In the network there are two-way roads connecting each ofthefollowingpairsofpoints:1with2,1with3,1with5,2with6,3with7,5

with 6, and 6 with 7. There are also one-way roads going from 2 to 4, from 3 to 2, and from 4 to 3. There are no other roads in the network, and the roads in the network do not intersect. To make a trip involving pickups and deliveries, the volunteer always takes a route that for the whole trip passes through the fewest of the points 1 through 7, counting a point twice if the volunteer passes through it twice. The volunteer's home is at point 3. Donations can be picked up at a supermarket at point 1, a clothing store at point 5, and a bakery at point 4. Deliveries can be made as needed to a tutoring center at point 2, a distribution center at point'6, and a shelter at point7.

1. If the volunteer starts at the supermarket and next goes to the shelter, the first intermediate point his route passes through mustbe

A: 2

B: 3

C: 5

D:6

E: 7

1. If, starting from home, the volunteer is then to make pickups for the shelter at the supermarket and the bakery (in either order), the first two intermediate points on his route, beginning with the first, mustbe

A: 1 and2

B: 1 and3

C: 2 and1

D: 2 and4

E: 4 and2

1. If, starting from the clothing store, the volunteer next is to pick up bread at either the supermarket or the bakery (whichever stop makes his route go through the fewest of the points) and then is to go to the shelter, the first two points he reaches after the clothing store, beginning with the first, mustbe

A: 1 and2

B: 1 and3

C: 4 and2

D: 6 and2

E: 6 and4

**For question 49 to 51**

Four telephone operators (Abid, Baqir, Chauhan, and Daud) each have to perform duties at the telephone exchange on four different days, Thursday through Sunday. The following is known about their duty schedule: Chauhan has his duty day before Abid. Daud has his duty day later than Baqir.

1. Which of the following is a possible order of duty days for the fouroperators?

A: Chauhan, Daud, Abid and Baqir.

B: Daud, Chauhan, Abid, and Baqir.

 C: Baqir, Chauhan, Daud and Abid.

D: Abid, Chauhan, Daud and Baqir.

E: Abid, Baqir, Daud and Chauhan.

1. If Chauhan has his duty day on Saturday, who must have his duty day on Thursday?

A: Either Abid or Daud.

B: Daud

C: Abid

D: Either Baqir or Daud.

 E: Baqir.

1. Each of the following is possibleEXCEPT:

A: Chauhan has his duty on Thursday.

B: Baqir has his duty on Thursday.

C: Daud has his duty on Saturday.

 D: Baqir has his duty on Sunday

 E: Abid has his duty onSunday.

**For question 52 to 53**

There are 12 seats facing the blackboard in a classroom, four seats

(A1, A2, A3 & A4) in that order are in row A, the first row from the blackboard. Immediately behind row A is row B with four seats (B1, B2, B3 & B4) in that order. Immediately behind row B, is the last row C with four seats (C1, C2, C3 & C4) in that order. Six students attend the class the following is known about there seating arrangement: Ejaz sits exactly in front of Comil, Seat A2 is always unoccupied Daud does not sit next to Farhat, Gharuy sits in seat A4 Hamid does not sit in seat B4 All the seats in row C always remain empty

1. If Daud sits in seat B3, then Farhat must sit inseat:

A: A3 B: A1 C: B4 D: B2 E: C2

1. Suppose that Hamid and Ejaz are sitting in seats A1 and A3 respectively, then it CANNOT be true thatseat:

A: B1 is occupied by Daud.

 B: B2 is empty

C: B1 isempty

D: B3 is OCCUPIED BY Comil

E: B4 is empty

**For question 54 to 57**

The principal of a school is forming a committee. There are to be five members: three teachers, chosen from Mr. J, Ms. K, Ms. L, Mr. M, and Mr. N; and two students, chosen from O, P, Q, and R. The composition of the committee must conform to the followingconditions:Ms.JwillserveonlyifRisalsoonthecommittee.Ms.Lwill

not serve unless Ms. K and O also serve. Neither Mr. M nor Mr. N will serve without the other. If P serves, neither Q nor R can serve.

1. Which of the following is an acceptablecommittee?

A: J, L, M, N,O

B: K, L, N, O,P

C: K, M, N, O,R

D: L, M, N, O,R

E: M, N, O, P,Q

1. How many different committees could include Mr. J and Q?

A: 1

B: 2

C: 3

D:4

E: 5

1. If Q and R are both on the committee, who else must be on the committee?

A: J

B: K

C:L

D:M

E: O

1. In how many different ways can the principal select an acceptable committee?

A: Fewer than3

B: 3

C: 5

D:7

E: More than 7

**For question 58 to 60**

Three adults—R, S, and V—will be traveling in a van with five children—F, H, J, L, and M. The van has a driver's seat and one passenger seat in the front, and two benches behind the front seats, one bench behind the other. Each bench has room for exactly three people. Everyone must at in a seat or on a bench, and seating is subject to the following restrictions: An adult must sit on each bench. Either R or S must sit in the driver's seat. J must sit immediately besideM.

1. Which of the following can sit in the front passenger seat?

A: J

B: L

C: R

D:S

E: V

1. Which of the following groups of three can sit together on a bench?

A: F, J, andM

B: R, H and M

C: S, F and L

D: R, F and J

E: V, F and M

1. If F sits immediately beside V, which of the following CANNOT be true?

A: J sits immediately besideS.

B: L sits immediately beside V.

C: H sits in the front passenger seat.

D: F sits on the same bench asH.

E: H sits on the same bench asR.

**End of Section C**