Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41233

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Second Semester

Civil Engineering

HS 6251 – TECHNICAL ENGLISH – II

(Common to all branches except Marine Engineering)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Rewrite the following as numerical expressions. (4×½=2)
   a) A refresher course for 2 weeks
   b) A flask with the capacity of 500 milliliters
   c) An iron rod of 5 millimeters
   d) A conference running for three days

2. Complete the 'If clauses' using correct tense of the verbs : (4×½=2)
   a) If it rains in the catchment areas, the reservoirs _____ (fill) up.
   b) If I were a Scientist, I _____ (invent) a cure for cancer.
   c) If the boys do not practice, they _____ (miss) the world cup.
   d) If the minister _____ (meet) the farmers, they would have given up the fast.

3. Fill in the blanks with the correct homophone from the words given : (4×½=2)
   a) Do you think you could _____ (buy/bye) me lunch and I'll pay you back tomorrow ?
   b) I need to _____ (meet/meat) my friend today.
   c) There is an awesome _____ (sight/site) for language learners.
   d) Do you _____ (wear/where) ties for functions ?

4. Rewrite the following sentences in the passive form : (2×1=2)
   a) The cyclone completely devastated the city of Chennai.
   b) The strong winds have uprooted 5 million trees.

5. Fill in the blanks with the most appropriate Modal verb from the list given. Change the form according to the meaning : (may, shall, should, might, need) **(4×½=2)**

a) The manager _____ call for a meeting tomorrow.
b) I _____ to update the manager about the situation.
c) He _____ come forward to offer solutions.
d) All of us _____ attend without fail.

6. Frame sentences using **any two** of the phrasal verbs : **(2×1=2)**

a) ask for b) break off c) break down d) go for

7. Combine the **two** sentences by using an appropriate clause : **(2×1=2)**

a) The residents were warned of the cyclone. They vacated their houses.
b) The man drove the car very fast on the highway. He met with an accident.

8. Use the following idioms by choosing the correct one for the blanks given. Make necessary changes in tenses : **(4×½=2)**

i) *explore all avenues* ii) *think on his feet*
iii) *delivers the goods* iv) *the acid test*

a) I practiced hard at the dance sessions but _____ will come when the master will assess our solo performances.
b) It is a difficult thing to do but if we really want it done, we must _____
c) A good sales man must be able to _____ to close the deal.
d) I have given my car to a new mechanic for repair, hope he _____ .

9. Frame sentences by using **any two** of the following words both as a noun and a verb : **(4×½=2)**

a) cover b) leave c) fall d) fly

10. Write in a sentence, what are the following implements/tools used for : **(2×1=2)**

Eg : An axe is used for cutting down wood.
a) A crane b) A pair of scissors.

PART – B **(5×16=80 Marks)**

11. i) Read the following passage and answer the questions given below :

If you look up at the sky on a clear night, you may see a red dot among the stars. This dot is Mars, named in ancient times after the Roman god of war. Although no one has ever visited this red planet, we know a lot about it. The bright rust colour Mars is known for is due to iron-rich minerals in its regolith – the loose dust and rock covering its surface. The soil of Earth is a kind of regolith, albeit one loaded with organic content. According to NASA, the iron minerals oxidize, or rust, causing the soil to look red.

Mars is more like Earth than any other planet in our solar system. Mars has a 24-hour day, a rocky crust, canyons, volcanoes, polar ice caps, and seasons. But Earth and the "4th rock from the Sun" are hardly twins. The carbon-dioxide-rich atmosphere of Mars is also roughly 100 times less dense than Earth's on average, but it is nevertheless thick enough to support weather, clouds and winds. The density of the atmosphere varies seasonally, as winter forces carbon dioxide to freeze out of the Martian air.

Mars is half as big as Earth and has less gravity. It has very little atmosphere. The surface of Mars has no lakes or oceans, plants or animals. No place on Earth gets as cold as Mars. The lack of life on the surface of Mars isn't surprising, considering the bone-dry environment.

In 1997, the spacecraft Pathfinder landed on Mars with a six-wheeled, high-tech robot names Sojourner. Sojourner's movements were made by remote-control from Earth, with a delay of about six minutes (because the radio signals had to travel all the way to Mars). Pathfinder found that some Martian rocks were stacked and leaning, as if they had been swept along by an ancient flood. Most importantly, this was the first time that the U.S. landed a remote-control rover on another planet – and it worked !

a) Choose the correct answer : **(4×1=4)**

1) The spacecraft that landed on Mars in 1997 is
   a) Sojourner b) Pathfinder
   c) High-tech robot d) Curiosity

2) The planet Mars has red colour because
   a) It has no lakes and oceans
   b) It reflects red colour of the sun
   c) Of the presence of iron rich minerals
   d) Of the oxidization of iron rich minerals

3) The time taken for the radio signals to reach Mars from earth is
   a) 4 minutes b) 6 minutes
   c) reaches immediately d) 24 hours

4) Which of the following statements is false ?
   a) Mars is named after the Roman god of war
   b) A day in Mars has 24 hours
   c) The gravity in Mars is more than that of it in earth
   d) There is no life on Mars because of the dry environment

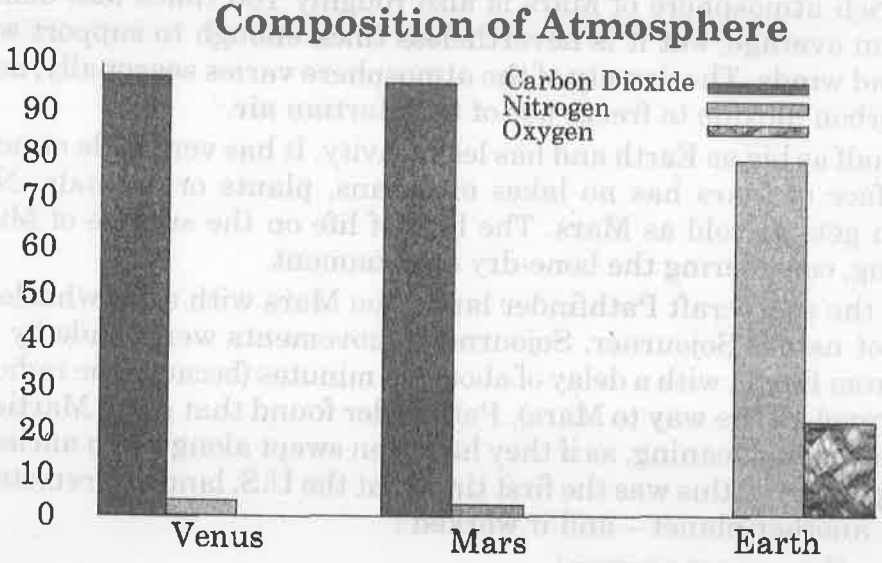
b) Answer the following questions in **two** or **three** sentences : **(2×2=4)**

5) What differences can one find between the Earth and the Mars ?

6) Based on the text, what might have been Pathfinder's purpose on Mars ?

c) Write **any four** additional instruments man has to take if he travels to Mars. State the purpose for taking them. **(4)**

ii) The following chart represents the composition of different gases in the atmosphere of the Venus, Mars and the Earth. Analyze the given data and write a paragraph of **100** words : (4)



12. a) Read the following passage and answer the questions below :

Many great inventions are initially greeted with ridicule and disbelief. The invention of the airplane was no exception. Although many people who heard about the first powered flight on December 17, 1903 were excited and impressed, others reacted with peals of laughter. The idea of flying an aircraft was repulsive to some people. Such people called Wilbur and Orville Wright, the inventors of the first flying machine, impulsive fools. Negative reactions, however, did not stop the Wrights. Impelled by their desire to succeed, they continued their experiments in aviation.

Orville and Wilbur Wright had always had a compelling interest in aeronautics and mechanics. As young boys they earned money by making and selling kites and mechanical toys. Later, they designed a newspaper-folding machine, built a printing press, and operated a bicycle-repair shop. In 1896, when they read about the death of Otto Lilienthal, the brothers' interest in flight grew into a compulsion.

Lilienthal, a pioneer in hang-gliding, had controlled his gliders by shifting his body in the desired direction. This idea was repellant to the Wright brothers, however, and they searched for more efficient methods to control the balance of airborne vehicles. In 1900 and 1901, the Wrights tested numerous gliders and developed control techniques. The brothers' inability to obtain enough lift power for the gliders almost led them to abandon their efforts.

After further study, the Wright brothers concluded that the published tables of air pressure on curved surfaces must be wrong. They set up a wind tunnel and began a series of experiments with model wings. Because of their efforts, the old tables were repealed in time and replaced by the first reliable figures

for air pressure on curved surfaces. This work, in turn, made it possible for the brothers to design a machine that would fly. In 1903 the Wrights built their first airplane, which cost less than $ 1,000. They even designed and built their own source of propulsion-a lightweight gasoline engine. When they started the engine on December 17, the airplane pulsated wildly before taking off. The plane managed to stay aloft for 12 seconds, however, and it flew 120 feet.

By 1905, the Wrights had perfected the first airplane that could turn, circle and remain airborne for half an hour at a time. Others had flown in balloons and hang gliders, but the Wright brothers were the first to build a full-size machine that could fly under its own power. As the contributors of one of the most outstanding engineering achievements in history, the Wright brothers are accurately called the fathers of aviation.

a) Choose the correct answer for the questions : **(4×1=4)**

1) The idea of flying an aircraft was _____ to some people.
   A) boring B) distasteful
   C) exciting D) needless

2) People thought that the Wright brothers had
   A) acted without thinking
   B) been negatively influenced
   C) been too cautious
   D) acted in a negative way

3) The Wrights' interest in flight grew into a
   A) financial empire B) plan
   C) need to act D) foolish thought

4) Lilienthal's idea about controlling airborne vehicles was _____ the Wrights.
   A) proven wrong by
   B) opposite to the ideas of
   C) accepted by
   D) improved by

b) Answer the following questions in **one** or **two** sentences : **(3×2=6)**

5) What new finding of the Wright brothers made it possible to design an engine that would fly ?

6) Identify two qualities of the Wright brothers that were responsible for their success.

7) Why are the Wright brothers called the fathers of aviation ?

c) Write a summary of the passage in about **100** words : **(6)**

(OR)

b) Read the following passage and answer the questions given below :

By "biofuels" I mean fuels for vehicles, such as "biodiesel" and "bioethanol"-although you can also use the term "biofuel" to cover any kind of fuel made from living materials or their waste. Biofuels are made from two main sources :

i) Growing crops such as corn, sugar cane, soya or rapeseed; or from palm oil
ii) Growing algae.

For powering vehicles, the product is usually bioethanol or biodiesel. Bioethanol is mixed with petrol, whilst biodiesel can be used on its own. Biofuels are potentially carbon-neutral, because although carbon dioxide is released when we burn them, carbon dioxide is taken in by the plants as they grow. However, energy is needed to grow the crops, harvest them, and to process the results into usable products-and most of this energy will be from fossil fuels for farm machinery and power stations.

Biofuels from crops : Crops such as rapeseed contain oils that can be processed into biodiesel. Crops such as sugar cane contain sugars that can be fermented into bioethanol. Producing biofuels from crops means using large amounts of land to grow those crops-that means less land for food production. We must be careful to strike a balance between crops for fuel and crops for food.

Biofuels from algae : Algae-that's pond scum-are microscopic water plants. They reproduce and photosynthesise fast, and the algae are then filtered out of the water and the lipids (oils) are used to make biodiesel. They can grow in transparent plastic tubes, arranged vertically so we can maximise the area available for photosynthesis without taking up too much land.

It is claimed that biofuels will help us to reduce our reliance on fossil-fuel oil, and that this is a good thing. On the other hand, it is also claimed that it takes a huge amount of land to grow enough crops to make the amount of biofuels we'd need, so much so that it makes a big dent in the amount of land available for growing food.

Who is right ? Should we be using more biofuels and less fossil fuels ? Think about the carbon dioxide-there are similar CO_2 emissions from biofuel-powered vehicles as from petrol-powered ones. It is claimed that growing plants to make biofuels will take in that carbon dioxide again. But biologists tell us that forests are not 'the lungs of the planet' after all-they give out as much CO_2 as they absorb as the plants respire. It seems that it's plant plankton in the oceans that takes in most CO_2 and gives out most oxygen. Biofuels are renewable, we can plant more of the crops or grow more of the algae.

a) Complete the sentences by filling the blanks with correct words : **(4)**

1) The two products used to power vehicles are _____ and _____
2) Sugar from sugar has to be _____ in order to make bioethanol.
3) Biofuels shall help to reduce relying on _____
4) Majority of the CO_2 is absorbed by _____

b) Answer the following questions : (3×2=6)

5) Why are biofuels called 'carbon neutral' ?

6) Why should the algae be grown in transparent plastic tubes ?

7) What does it mean 'trees are not the lung of the planet' ?

c) Write three advantages and disadvantages of biofuels as you read from the passage. (6)

13. a) You have come across the following advertisement in the newspaper on 3rd August 2017. Write a letter of application and a detailed CV to the post advertised.

IOCL Jobs 2017 : 02 Research Fellow Vacancy for B. Tech. published on 3rd August 2017.

Apply to

The General Manager I/C (HR) Indian Oil Corporation Limited, Research & Development Centre, Sector-13, Faridabad-121007, Haryana, India

(OR)

b) You come across the following advertisement in a website www.careesman.in

Job ID 1009727 Date posted 8/9/2017

Primary Location : Bengaluru, Karnataka, India

Job Category : Engineering Schedule

Full timeshift : No shift premium (India)

Hewlett Packard Enterprise

Education and Experience Required :

- Bachelor's or Master's degree in Computer Science, Information Systems, or equivalent.
- **Typically 1 year experience.**

Knowledge and Skills :

- Strong analytical and problem solving skills.
- Designing software systems running on multiple platform types.
- Excellent written and verbal communication skills; mastery in English and local language, Ability to effectively communicate product architectures, design proposals and negotiate options at management levels.

Send your application with CV to hr@hewlett.ent.in.

14. a) You are working in Hindustan Petroleum Limited. Your company is planning to expand its services to the nearby town. Prepare a Feasibility Report. This report should contain among other things the background, Method or methodology, feasibility of the project, conclusion and recommendation.

(OR)

b) You along with two of your friends went for an industrial visit. Prepare a Report to be submitted to your HOD. This report should contain i) industry visited ii) objectives/purpose iii) learning outcome iv) experience collected v) impression of the industry etc.

15. a) Ranjit meets a scientist who works along with the team in Mars mission. Curious to know about the program, he puts forth questions, for which the scientist responds. Build up a conversation. Make a minimum of eight exchanges. (16 sentences) the first one is done for you.

Ranjit : Hellow Sir, I'm Ranjit, a student of engineering.

Scientist : Oh! very glad to meet you. I was also an engineering graduate passed out from MIT ten years ago.

(OR)

b) You want to buy a new watch and you visit the showroom. What kind of dialogue would take place between you and the marketing executive ? You finally decide to go for a particular brand. Make atleast eight exchanges, (16 sentences) highlighting the marketing strategies used by the executive. The first one is done for you.

Marketing Executive : Hello Sir, May I help you ?

You : I'm on the lookout for a wrist watch.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40057

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Second Semester

Aeronautical Engineering

MA 8251 – ENGINEERING MATHEMATICS – II

(Common to all branches, except Marine Engineering)

(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. If 3 and 5 are two eigenvalues of the matrix.

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$ then find its third eigenvalue and hence $|A|$.

2. Show that the eigenvalues of a null matrix are zero.

3. If $\vec{F} = x^3\,\vec{i} + y^3\vec{j} + z^3\,\vec{k}$, then find div curl $\vec{F}$.

4. Find the values of a, b, c such that the following vector is irrotational.
$\vec{F} = (x + 2y + az)\,\vec{i} + (bx - 3y - z)\,\vec{j} + (4x + cy + 2z)\vec{k}$.

5. If $f(z) = r^2 (\cos 2\theta + i \sin p\theta)$ is analytic, then find the value of 'p'.

6. Examine whether the function $u = xy^2$ can be a real part of an analytic function.

7. If 'C' is the circle $|z| = 3$ and if $g(z_0) = \int_C \frac{2z^2 - z - 2}{z - z_0}\,dz$ then find g(2).

8. Find the value of $\int_C \frac{3z^2 + 7z + 1}{z + 1}\,dz$ if C is $|z| = \frac{1}{2}$.

9. If L [f(t)] = F(s) then prove that L [f (at)] = $\frac{1}{a} F\left(\frac{s}{a}\right)$.

10. Find the Laplace transform of $\left[\frac{t}{e^t}\right]$.

PART – B (5×16 = 80 Marks)

11. a) i) Find the eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{bmatrix}$ (8)

ii) Using Cayley-Hamilton theorem find the inverse of the given matrix

$A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 2 & 1 \\ 1 & 1 & 3 \end{bmatrix}$. (8)

(OR)

b) Reduce the quadratic form $2x^2 + 5y^2 + 3z^2 + 4xy$ to a canonical form through an orthogonal transformation. Find also its nature. (16)

12. a) Verify the Gauss divergence theorem for $\vec{F} = x^3\,\vec{i} + y^3\,\vec{j} + z^3\,\vec{k}$ taken over the cube bounded by x = 0, x = a, y = 0, y = a, z = 0 and z = a. (16)

(OR)

b) Verify Stoke's theorem for $\vec{F} = (y - z + 2)\,\vec{i} + (yz + 4)\,\vec{j} - (xz)\,\vec{k}$ where S is the open surface of the cube x = 0, x = 2, y = 0, y = 2, z = 0 and z = 2 above the xy -plane. (16)

13. a) i) Find the analytic function f(z) = u + i v if $u - v = e^x [\cos y - \sin y]$. (8)

ii) Find the bilinear transformation which maps the points z = –1, 0, 1 on to the points w = –1, –i, 1. Show that under this transformation the upper half of the z-plane maps on to the interior of the unit circle |w| = 1. (8)

(OR)

b) i) If f(z) = u + i v is an analytic function then prove that

$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)(u^p) = p\,(p-1)\,(u^{p-2})\,|f'(z)|^2$. (8)

ii) Find the image of the circle |z – 2i| = 2 in the complex plane under the transformation $w = \frac{1}{z}$. (8)

14. a) i) Evaluate $\int_C \frac{z^2}{(z^2+1)^2}\,dz$ where C is the circle $|z-i| = 1$ by using Cauchy's integral formula. **(8)**

ii) Expand $f(z) = \frac{6z+5}{(z+1)\,z\,(z-2)}$ in Laurent's series valid for $1<|z+1|<3$. **(8)**

(OR)

b) Evaluate $\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos\theta}\,d\theta$ using contour integration. **(16)**

15. a) i) Using convolution theorem find the inverse Laplace transform of $\left[\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right]$. **(8)**

ii) Find the Laplace transform of [t cos t sin h 2t]. **(8)**

(OR)

b) i) Find L [f(t)] if $f(t) = \begin{cases} 1, & 0<t<1 \\ 0, & 1<t<2 \end{cases}$ given f (t + 2) = f(t). **(8)**

ii) Solve $y'' - 3y' + 2y = 1$ given that $y(0) = 0$, $y'(0) = 1$ by using Laplace transform method. **(8)**
