

Q-1.

- i. Who is the first Indian woman to join the International Olympics Committee?
[A]Deepika Arora, [B]Ipsita Dasgupta, [C]Mary Kom, [D]Nita Ambani
अंतरराष्ट्रीय ओलंपिक समिति में शामिल होने वाली पहली भारतीय महिला कौन है?
[A] दीपिका अरोड़ा, [B] ईप्सिता दासगुप्ता, [C] मैरी कॉम, [D] नीता अंबानी
- ii. What is the mascot of the 2016 Rio Summer Olympics?
2016 रियो ग्रीष्मकालीन ओलंपिक का मेकट क्या है ?
[A]Wenlock, [B]Vinicius, [C]Tom, [D]Mukmuk.
- iii. The World Elephant Day is observed on which date?
दुनिया का हाथी दिवस कब मनाया जाता है ?
[A]August 11, [B]August 13, [C]August 14, [D]August 12
- iv. In the context to India's wild life, who is the flying fox?
[A]Bat, [B]Vulture, [C]Stork, [D]Eagle.
भारत के वन्य जीवन के लिए संदभामय फ़्लाइंग फॉक्स कौन है?
[A] चमगादड़, [B] भूय, [C] सारस, [D] ईगल
- v. Which among the following is measured by Dobson unit?
[A]Ozone concentration, [B] Thermal conductivity, [C]Soil moisture, [D]Radiation.
दुबसन इकाई द्वारा मापा जाता है?
[A] ओजोन एकांता, [B] थर्मल चालकता, [C] मृदा नमी, [D] विकिरण
- vi. The GRIHA is a rating tool related to which one of the following fields?
[A]Buildings, [B]Automobiles, [C]Industries, [D]Airlines.
GRIHA दुबनलखत में से कसका रेटिंग उपकरण है?
[A] इमारत, [B] ऑटोमोबाइल, [C] इंडुस्ट्री, [D] एयरलाइंस।
- vii. 9th August,1925 is known in the Indian History for which of the following incidences?
[A] Chauri Chaura incidence, [B] Kakori Train Robbery, [C] Jallianwallah Bagh Incidence, [D] The seize of Cawnpore.
9 वीं अगस्त, 1925 भारतीय इतिहास में दुबनलखत कौनसा घटनाओं के लिए जाना जाता है?
[A] चौरा चौरा घटना, [B] काकोरी ट्रेन डकैती, [C] जलियानवाला बाग घटना, [D] कानपुर का जल।
- viii. Who among the following was the first president of Constituent Assembly?

[A] Dr. Rajendra Prasad, [B] Sachidanand Sinha [C] Jawahar Lal Nehru, [D] Dr.B.R.Ambedkar

संविधान सभा का पहला राष्ट्रपति जनानलखत मसे कौन था?

[A] डॉ. राजेण साद, [B] सचिदानंद साहा [C] जवाहर लाल नेहण ,
[D] डॉ. बी.आर. आम्बेदकर

ix. Which among the following was also known as Western Presidency in early times of East India Company?

[A] Bombay, [B] Surat, [C] Pune, [D] Panji.

जनानलखत मसे कौन सा भी ईण्ट इंडिया कंपनी के शुआती समय मपचिमी ढेसीडखी के ढप मजाना जाता था?

[A] मुंबई, [B] सूरत, [C] पुणे, [D] पंजी ।

x. Which is the longest bone in the human body?

मानव शरर मसबसे लंबा हडी ढया है?

[A]Fibula, [B]Ulna, [C]Femur, [D]Tibia

xi. Who was the first Indian to go into space?

[A]Rakesh Sharma, [B]Satish Dhawan, [C]Ravish Malhotra, [D]Kalpana Chawla

अंतरण मजाने वाले पहले भारतीय कौन था?

[A] राकेश शमा [B] सतीश धवन, [C] रवीश मणोण, [D] कपना चावला

xii. Which is the nearest star to planet earth?

[A]Venus, [B]Mars, [C]Sun, [D]Alpha Centauri

पृवी के सबसे नजदक तारा ढया है?

[A] शुण , [B] मंगल, [C]राव, [D] अण सटायुण

xiii. Kargil Vijay Diwas is celebrated on which date?

[A]July 26, [B] July 27, [C] July 25, [D] July 28.

कारणल व्रजय ढवस कब मनाया जाता है?

[A] 26 जुलाई [B] 27 जुलाई, [C] 25 जुलाई, [D] जुलाई 28

xiv. Dr. V. Kurien is famous in the field of _____?

[A]Atomic power, [B]Dairy development, [C]Economic reforms, [D]Poultry farms

डॉ वी कुरियन कौन सा ढेण मणणसा है-

[A] परमाणु शक्ति, [B] डेयरण व्रकास, [C] आर्थिक सुधार, [D] ढोणण फामण

xv. Who is the new Prime Minister of United Kingdom (UK)?

[A] David Cameron, [B] Boris Johnson, [C] Theresa May, [D] Tony Blair.

यूनाइटेड किंगडम (UK) के नए प्रधानमंत्री (यूके) कौन हैं?

[A] डेव्हड कैमरून, [B] बोएस जॉनसन, [C] थेरेसा मई, [D] टोनी ब्लेयर।

- xvi. Sushila Chanu is associated with which sports?
[A] Hockey, [B] Wrestling, [C] Football, [D] Cricket.

सुशीला चानू जो खेल के साथ जुड़ा हुआ है?

[A] हॉकी, [B] कुश्ती, [C] फुटबॉल, [D] क्रिकेट।

- xvii. Who was the first man to travel in space?
[A] Edwin Aldrin, [B] Neil Armstrong, [C] Yuri Gagarin, [D] Mikhail Gorbachev

अंतरिक्ष में यात्रा करने वाले पहला आदमी कौन था?

[A] एडवर्ड एलड्रिन, [B] नील आर्मांग, [C] यूरी गागारिन, [D] मिखाइल गोर्बाचेव

- xviii. Which country is the company Nestle head quartered?
[A] Sweden, [B] Switzerland, [C] The Netherlands, [D] Luxemburg

किस देश में नेस्ले कंपनी का मुख्यालय है?

[A] स्वीडन, [B] स्विट्जरलैंड, [C] नीदरलैंड, [D] लक्जमबर्ग

- xix. For work in which field did Albert Einstein win the Nobel prize in Physics?
[A] Photo electric effect, [B] Theory of Relativity, [C] Discovery of Electron, [D] Discovery of radium.

जो क्षेत्र में अल्बर्ट आइंस्टीन भौतिकी में नोबेल पुरस्कार जीता-

[A] फोटो इलेक्ट्रिक प्रभाव, [B] सापेक्षता के सिद्धांत, [C] इलेक्ट्रॉन की खोज, [D] रेडियम की खोज।

- xx. Dry Ice is-
सूखी बर्फ क्या है?
[A] Liquid Nitrogen, [B] Water Ice, [C] Solid Carbon dioxide, [D] Frozen Ethanol

- xxi. The first Indian lady swimmer to have crossed the English Channel
पहली भारतीय महिला तैराक जो अंग्रेजी चैनल को पार करी-
[A] Bula Choudhury, [B] Arati Saha, [C] Nilima Ghosh, [D] Bachendri Pal

- xxii. India changed over to the decimal system of coinage in-
कब भारत में दशमलव प्रणाली को बदल दिया?
[A] April 1995, [B] April 1957, [C] April 1958, [D] April 1959

- xxiii. The first wholly Indian Bank was set up in
कब पहली पूर्णतः भारतीय बँक स्थापित किया गया था?
[A] 1794, [B] 1894, [C] 1896, [D] 1902

- xxiv. Who invented the BALLPOINT PEN?

किसने BALLPOINT PEN आविष्कार किया?

[A] Biro Brothers, [B]Waterman Brothers, [C] Bicc Brothers, [D]Write Brothers

xxv. Who is the English physicist responsible for the 'Big Bang Theory'?

अंग्रेजी भौतिक विज्ञानी 'बिग बंग थ्योरी' के लिए जिम्मेदार कौन हैं-

[A]Albert Einstein, [B] Michael Skube, [C] George Gamow, [D] Roger Penrose

xxvi. Which of the gas is not known as green house gas?

इनमेंसे एक ग्रीन हाउस गैस के रूप में नहीं जाना जाता है-

[A] Methane, [B]Nitrous oxide, [C] Carbon dioxide, [D] Hydrogen

xxvii. '.MOV' extension refers usually to what kind of file?

[A]Image file, [B]Animation/movie file, [C] Audio file, [D]MS Office document

'MOV'.विस्तार किस तरह का फाइल करने के लिए आम तौर पर संदर्भित करता है?

[A]छवि फाइल, [B] एनीमेशन फॉर्म फाइल /, [C] ऑडियो फाइल, [D] एमएस कार्यालय दस्तावेज़

xxviii. What does VVVF stand for?

VVVF क्या है?

[A] Variant Voltage Vile Frequency, [B] Variable Velocity Variable Fun, [C] Very Very Vicious Frequency, [D] Variable Voltage Variable Frequency

xxix. Dr. M. S. Swaminathan has distinguished himself in which of the following fields?

[A] Agriculture, [B] Medicine, [C] Astrophysics, [D] Physics

डॉ एम. एस. स्वामीनाथन खुद को किस फ़िल्ड में प्रतिष्ठित किया है?

[A] कृषि, [B] वैद्यक-शास्त्र, [C] खगोल भौतिकी, [D] भौतिक विज्ञान

xxx. Who wrote the line: 'A thing of beauty is a joy forever'?

कौन लिखा था :A thing of beauty is a joy forever?

[A] John Keats, [B]Robert Browning, [C] P.B.Shelley, [D] William Wordsworth

Q-2:

Translate into Hindi: हंदी में अनुवाद करे

(i)Memorandum; (ii)Service Register (iii)Confidential Report, (iv)Please Speak (v)Widow Complimentary Pass, (vi)Urgent (vii)Appointment on compassionate grounds (viii)increment (ix)Industrial Relations (x)Seniority List (xi)Honorarium (xii)Gazette Notification (xiii)Fixation of Pay (xiv)Official Language (xv)No Objection Certificate (xvi)Nominee (xvii)Notification (xviii)Oath of allegiance (xix)Personnel Department (xx)Periodical Medical Examination.

Q-3:

- (i) The difference between a two digit number and the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?
[A] 4, [B] 9, [C] 3, [D] Can not be determined.

एक दो अंक का संख्या और संख्या के digits interchanging द्वारा प्राप्त संख्या के बीच का अंतर 36 है। संख्या के दो digits के बीच का अंतर है?
[A] 4, [B] 9, [C] 3, [D] निर्धारित नहीं किया जा सकता है

- (ii) A dealer allowed a discount of 25% on the marked price of Rs.12000 on an article and incurred a loss of 10%. What discount should he allow on the marked price so that he gains Rs. 440 on the article?

एक व्यापार एक वस्तु पर 12000 रूपए का अंकित कीमत पर 25% का छूट देता और उसे 10% का घटा हुआ। अंकित कीमत पर क्या डिस्काउंट देना चाहिए ताकि वह वस्तु पर उसका 440 रूपए का लाभ होगा।

[A] 11%, [B] 13%, [C] 19%, [D] 15%

- (iii) One morning after sunrise Vikram and Shailesh were standing in a lawn with their back towards each other. Vikram's shadow fell exactly towards left-hand side. Which direction Shailesh was facing ?
[A] East, [B] West, [C] North, [D] South

एक सुबह सूर्यास्त के बाद विक्रम और शैलेश एक दूसरे के पीछे अपनी पीठ करके एक लॉन में खड़े थे। विक्रम का छाया बाएँ हाथ की ओर पड़ रहा था। शैलेश कौन सी दिशा का सामना कर खड़ा था?

[A] पूर्व, [B] पश्चिम, [C] उत्तर, [D] दक्षिण

- (iv) A is B's sister. C is B's mother. D is C's father. E is D's mother. Then, how is A related to D?
[A] Grandfather, [B] Grandmother, [C] Daughter, [D] Granddaughter

A B की बहन है। C B की माँ है। D C की माँ है। E D की माँ है। तो, A D से कैसे संबंधित है?

[A] दादा, [B] दादी, [C] बेटा, [D] पोती.

- (v) Today is Varun's birthday. One year from today, he will be twice as old as he was 12 years ago. How old is Varun today?
[A] 20 years, [B] 22 years, [C] 25 years, [D] 27 years

आज वरुण का जन्मदिन है। आज से एक साल के बाद अपनी उम्र 12 साल पहले की उम्र के दोगुना हो जाएगा। वरुण की उम्र आज क्या है।
[A] 20 साल, [B] 22 साल, [C] 25 साल, [D] 27 साल

Paper-I(Part-II) पेपर-I (भाग -II)

Q-4:-

A 500V, 25 HP, DC shunt motor takes a current of 2.4Amp while running light loaded. The field and armature resistances are 650 ohms and 0.57 ohm, respectively. Calculate the full-load efficiency, assuming a brush drop of 2V?

एक 500V , 25 HP, DC शंट मोटर 2.4 Amp current लेता है, जबकि हलका लोड चल रहा है। Field और Armature resistances 650 ohms और 0.57 ohm , मश: ह॥ यह मानते हुए 2 वोल्ट brush drop, पूरा लोड efficiency का गणना करे?

Q-5:-

- (i) Explain in detail different power losses in semiconductor power devices?
semiconductor power उपकरणों में power loss का तार से समझाएँ?
- (ii) Explain the basic properties of dielectrics. What do you understand by the loss tangent and susceptibility?
Dielectrics के बुनियादी गुणों का ब्याख्या करे। आप loss tangent और susceptibility से क्या समझते हए

Q-6:-

A large consumer of electricity requires 10kW, 230V r.m.s of power at a power factor angle of 60° lagging through a transmission line of resistance 0.1 ohm. Determine the power produced by the utility to meet the load demand. If the consumer corrects his power factor from 0.5 to 0.9 lagging, what power the utility has to produce to meet the load demand?

बजल का एक बड़ा उपभोक्ता को 10kW, 230V r.m.s power, 60° lagging power factor का power 0.1 Ohm resistance transmission लाइन के माध्यम से आवश्यकता है। बजल लोड का मांग को पूरा करने के लिए utility द्वारा उत्पादित बजल का अनुमान करे। अगर उपभोक्ता अपना power factor 0.5 lagging से 0.9 lagging को सुधार का, तो उपभोक्ता का बजल लोड का मांग को पूरा करने के लिए utility को कितना बजल उत्पादन करना है?

Q-7:-

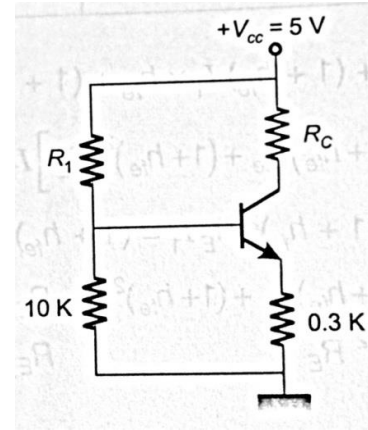
Draw the circuit of a Kelvin's Double-Bridge used to measure low resistance. Derive the condition for balance. Calculate insulation resistance of a cable in which the voltage falls from 100 to 80V in 20 sec. The capacitance is 300 pF. (Given $\log_{10} 2 = 0.30$).

कम प्रतिरोध को मापने के लिए इतमाल एक Kelvin's Double-Bridge के सर्किट का करे। संतुलन के लिए शर्तों का निकाल करे। एक केबल में 20 सेकंड में 100V से 80V वोल्टेज में के लिए इंसुलेशन प्रतिरोध का हिसाब लगाए। Capacitance=300 pF. ($\log_{10} 2 = 0.30$).

Q-8:-

The BJT amplifier of the given figure has $h_{fe}=100$, $V_{BE}=0.7V$, $I_{C0}=0$. Calculate the values of R_1 and R_c such that its $I_c=1\text{ mA}$ and $V_{CE}=2.5V$.

दिए गए चित्र के BJT एम्पलीफायर का $h_{fe}=100$, $V_{BE}=0.7V$, $I_{C0}=0$ है। R_1 और R_c के मूल्य का गणना ऐसी करे कि इसके $I_c=1\text{ mA}$ और $V_{CE}=2.5V$.



Q-9:

A series generator of total resistance 0.5 ohm is running at 1000 rpm and delivering 5 kW at a terminal potential difference of 100V. If the speed is raised to 1500 rpm and the power is adjusted to 8kW, find the new current and terminal voltage. Assume that the machine is working on the straight portion of the characteristic such that the flux is proportional to the current and the emf generated is proportional to product of flux and speed?

कुल प्रतिरोध 0.5 ohm का एक Series जनरेटर 1000 rpm पर चल रहा है और 100V के एक टर्मिनल potential difference से 5 kW देता है। यदि गति 1500 rpm को बढ़ा लए और power को 8kW adjust किया जाता है, तो नई Current और टर्मिनल वोल्टेज का हिसाब लगाए। मान लए कि मशीन विशेषता इस तरह के सीधे भाग पर काम कर रहा है कि Flux Current का अनुपातिक और उभयोन emf Flux और गति के गुणन के अनुपातिक है।

Q-10:-

Define "Amplitude Modulation" and "Modulation Index". Write down the equations for (i) Amplitude and (ii) Instantaneous voltage of the Amplitude modulated wave. Draw the graph of an Amplitude modulated wave.

"Amplitude Modulation" और "Modulation Index" परिभाषित करे। Amplitude Modulated wave के लिए (i) Amplitude और (ii) तात्कालिक वोल्टेज का समीकरण लिखे। Amplitude Modulated wave का ग्राफ खींचे।

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East Coast Railway

Question paper for selection to group 'B' post of AEE scale Rs. 9300-34800 and G.P. of Rs. 4800 against 30% LDCE quota in Electrical Deptt.

Date : 01.03.2009

Max./Qualifying Marks 150/90

Time : 3 Hrs.

Professional Paper – II (I)

- Note : (i) Answer to be written either in blue or black indelible ink and no other ink or pencil be used otherwise answer sheet shall not be evaluated. However sketches/diagrams can be drawn by pencil only.
- (ii) Questions may be answered either in Hindi or English except the question to test the knowledge of English which is to be answered in English only.
- (iii) Marks are indicated against each question.
- (iv) All questions in part I and any five (5) questions in part II are required to be answered.
- v) In case of any ambiguity/confusion/discrepancy between English and Hindi version of the Q. paper, English version shall be taken as correct.

Handwritten notes and scribbles on the right side of the page, including the number '50' and some illegible markings.

Part- I, English & General Knowledge

Q.1 Read the following passage carefully and answer the questions that follow ;

Getting a good night's sleep can help you cope with stress more effectively. But not getting enough sleep can cause more stress. Insomniacs have higher concentration of stress hormones than others. Women are prone to sleep disturbances. Their sleep problems frequently interfere with their daily activities.

Experts believe that sleep, especially deep sleep enables our nervous system to function well. Without it we lose our ability to concentrate, remember or analyze. Some experts speculate that during deep sleep, cells manufacture more proteins, which are essential for cell growth and repair of damage from things like stress and ultra-violet rays.

Scientists believe that activity in the area of our brain that control emotions and social interactions lessens during sleep and that deep sleep may help people be emotionally and socially adept when awake. Sleep may also help our brain to store a newly learned activity in its memory bank. In a study in Canada students deprived of deep sleep after learning a complex logic game showed a 30 percent learning deficit when tested a week later compared with students not deprived of sleep.

The effects of sleep deprivation on other bodily functions are just as alarming. In studies from five medical centres across the country, researchers established that individuals with insomnia were also more likely to have poor health including chest pain, arthritis and depression, and to have difficulty accomplishing daily tasks. Another break-through study revealed that even temporary loss of sleep can affect the body's ability to break down carbohydrates, interfere with functions of various hormones and worsen the severity of ailments such as diabetes and high blood pressure.

So whatever works to help you sleep well, whether it is regular exercise earlier in the day, weekly massages, yoga, meditation or a lavender scented bath, make time for it today.

On the basis of understanding of the above passage, complete the following sentences while writing only the answers in the answer sheet.

5

- a) While good sleep helps to ^{cope with stress} (i) lack of it can (ii) ~~insomnia~~ / ~~depression~~
- b) Deep sleep makes the nervous system (i) so that we can (ii) ^{to function well} well.
- c) Two ways suggested to promote good sleep in the passage are (i) ^{regular exercise in the day} and (ii) ^{meditation} yoga / meditation.
- d) A Canadian research on student's sleep has proved that ^{30%} ^{learning defects}
- e) Ill effects of insomnia are (i) ^{Poor health}, (ii) ^{chest pain}, (iii) ^{arthritis}, and (iv) ^{depression}

Q.2 Write the correct sentence :-

- i) Correct the sentence who are wrong.
ii) I know somebody that can help you.
iii) We had lovely weather/ a lovely weather when we were on holiday.
iv) I need my glasses but I can't find it/them.
v) Help the poors.

Q.3 Write down the answers only in the answer sheet :-

40

- i) When was the first electric train run on Indian Railways?
ii) Which compound is used in extinguishing fires, for cleaning, as a deodorizer, and even in making cakes?
iii) What type of mirror is used by motorists to see the vehicles behind?
iv) Name the three (3) countries which have the same name as its capital city? ^{Singapore, Kuala Lumpur}
v) How many no. of Districts are there in state of Orissa?
vi) How much is one (1) hectare in terms of acre?
vii) What was the city named as 'Manchester of India'? ^{Surat}
viii) With which part of the body is the disease Pyorrhoea associated? ³⁰
ix) Who invented the dynamo? ¹⁹⁶⁰
x) What is the chemical name of Milk of Magnesia? ^{Mg(OH)₂}
xi) Which worm lives on blood? ^{Cyclops}
xii) Which gland in the human body secretes insulin?
xiii) Name the city where the common wealth games in 2010 are being held?
xiv) Which is the latest division formed on Indian Railways?
xv) Name the Chairman of the present Railway Board?

Write down the correct answer in the following multiple choice questions.

xvi) Gases referred to as Green House gases are -

- a) CO₂, O₂, NO₂, NH₃
b) CO₂, NH₃, N₂, Chlorofluoro carbon
c) CH₄, N₂, CO₂, NH₃
d) CO₂, CH₄, NO₂, Chlorofluoro carbon

Shagun
vi] 25

HFC

- ✓ xvii) 'Chipko Movement' is concerned with -
 - ✓ a) Plant conservation b) Project tiger
 - c) Animal Breeding d) Plant Breeding
- xviii) The constitution of India was promulgated on-
 - ✓ a) Jan.26, 1950 ✓ b) Jan.26, 1951
 - c) Feb.26, 1950 d) Jan.26, 1952
- f xix) The upper House of the state legislature is the -
 - ✓ a) Legislative council b) Legislative Assembly
 - ✓ c) Council of State d) Lok Sabha
- xx) Recognition of a Political party can be suspended by -
 - ✓ a) Election Commission b) the President
 - c) the Supreme Court d) Parliament
- + xxi) Pollutant from motorcar that cause mental disease is -
 - a) Lead b) NO₂ ✓ c) SO₂ d) Hg
- + xxii) The diastolic pressure in a healthy person normally is -
 - a) 60 mm b) 80 mm ✓ c) 100 mm d) 120 mm ✓
- + xxiii) Who started the Boy Scout movement?
- + xxiv) In metrology, what is the basic unit of current?
- ✓ xxv) In which state the place Cooch Bihar situated? *WB*
- ✓ xxvi) Which is the brightest artificial light source? *Moon*
- ✓ xxvii) Mention the date on which ECoR was founded?
- xxviii) Name the river which flows by the side of Taj Mahal in Agra?
- ✓ xxix) In which country is kimono the traditional robe of women? *Japan*
- xxx) Which British Prime Minister called Mahatma Gandhi a 'Half-naked fakir'? *Churchill*
- ✓ xxxi) Which day is celebrated as International Labour Day?
- ✓ xxxii) Who wrote the book 'Gitanjali'?
- ✓ xxxiii) Which word describes 0.9144 of a metre? *Yard*
- ✓ xxxiv) Which is the highest civilian award given in India?
- ✓ xxxv) Name the place where Lord Buddha preached his first sermon?
- ✓ xxxvi) Name the person who was first to set his foot on moon?
- ✓ xxxvii) How many bits are there in a byte?
- ✓ xxxviii) Which is the scientific instrument used for measuring purity of milk? *Lactometer*
- ✓ xxxix) Who said 'Jai Jawan-Jai Kisan'?
- ✓ xxxx) With which game the Davis cup is associated?

Part - II Professional

100

Q.4 Write only the correct answers of the following :-

20

- i) The ratio of voltage and current in a closed circuit
 - a) remains constant b) varies c) increases d) falls
- ii) Electric conductivity is measured in
 - a) mho/m b) mho-m c) mho/m³ d) mho/m²

$R = \frac{l}{A}$

ohm.m

$\frac{A}{l} = \sigma$

- iii) A 1000w, 240V electric kettle of heating efficiency 80% is used for raising the temperature of 3.0 litre of water from 20⁰ C to 100⁰ C, the time taken is
 a) 14 min. b) 21 min. c) 17 min. d) 26 min.
- iv) Over charging of lead acid battery would cause
 a) excessive gassing b) loss of active material
 c) increase in temperature resulting in buckling of plates
 d) all of above
- v) Air coils are almost free from
 a) eddy current loss b) hysteresis loss
 c) both a) and b) above d) none of these
- vi) In a purely inductive circuit, which of the following power is zero? $X_L = 2\pi fL$ $\frac{KW}{KVA}$
 a) apparent b) reactive c) true d) inductive
- vii) The emf induced in the primary winding of the transformer
 a) is in phase with flux b) lags behind the flux by 90⁰
 c) leads the flux by 90⁰ d) is in phase opposition to that of flux
- viii) Which of the following is not a source of power
 a) solar cell b) thermo couple c) fuel cell d) photo-voltaic cell
- ix) Decrease in length of air gap between the stator and rotor of an induction motor will improve
 a) motor efficiency b) starting torque c) power factor d) pull-out torque
- x) Pyrometer is used to measure
 a) Strain b) pressure c) displacement d) temperature

Q.5 Define any five (5) of the following in brief: 20

- i) Demand factor of a power station ; ii) Voltage regulation of a transformer ; iii) Difference between Type, Routine, and Commissioning tests ; iv) Slip of an induction motor ; v) PELE box ; vi) Adhesion ; vii) SEC ; viii) Max. Demand of TSS ; ix) Sulphation ; x) Yield and discharge of the water supply pump

Q.6 Write short notes on any five (5) of the following: 20

- i) Duties of an Electrical Inspector to GOI
 ii) Power factor Improvement
 iii) Methods of reducing earth resistance of the system
 iv) Salient features of the Energy Conservation Act 2001
 v) Capacity test of 120 Ah battery set of coaches
 vi) Water raising apparatus
 vii) DBR vs Regenerative braking
 viii) Maintenance schedules of a WAG7 locomotives
 ix) Merits and Demerits of 25kV and 2X25 kV ac traction system
 x) Anti creep arrangement

Q.7 a) What are the qualities of good transformer oil? 5
 b) What are various losses in a power transformer, elaborate and define? 10

c) Define Electrical Accident. Who is the Electrical Inspector to the Central Government with respect to Railways for investigation of electrical accidents?

5

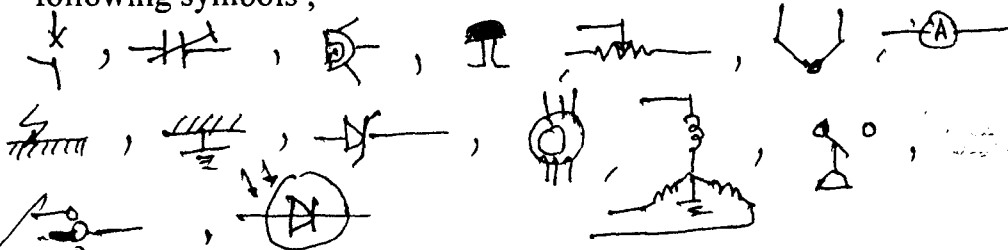
Q. 8 a) Write full form of the following ;

5

kVAR, ACSR, VRLA, SMI, HVDC, PIV, OLTC, ONAN, VIR, HDD

b) Write down the name of electrical equipment/component for the following symbols ;

15



Q.9 a) Why carbon is preferred for brushes in electric machines?

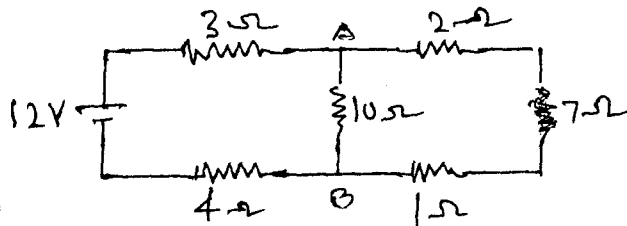
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b) Enumerate the conditions for successful parallel operation of two 30 power distribution transformer?

5

c) Find the current in the section AB of the circuit shown below:

10



$1A \times \frac{10}{20} = \frac{1}{2}A$

V_{OH} at
can parallel
 $Z_{eq} = \frac{1}{\frac{1}{kVA} + \frac{1}{kVA}}$
 $\frac{R}{X}$ ratio

Q.10 Write **only the answers** in the answer sheet :-

20

- i) Specific resistance of the conductor is dependent on
 - a) length ; b) dia ; c) material ; d) all of the above
- ii) The best method to improve the insulation resistance is to
 - a) increase dia of conductor
 - b) increase length of current carrying conductor
 - c) improve method of installation
 - d) increase dielectric strength of insulation
- iii) Kirchoff's current law is applicable to
 - a) closed loop ; b) electronic circuits
 - c) junction in a network ; d) electric circuits
- iv) The moving iron instruments can be used for measuring
 - a) dc ; b) ac ; c) radio frequency ; d) both a & b above
- v) Magnetic materials best suited for transformer cores have permeability and hysteresis loss.
 - a) high, low ; b) low, high ; c) low, low ; d) high, high
- vi) A work is done at the rate of 100 joules/sec. How many units of electric energy will be used in one (1) hour.
 - a) 0.1 unit ; b) 1.0 unit ; c) 0.36 unit ; d) 0.742 unit

$R = \frac{l}{A}$; $\rho = \frac{R \cdot A}{l}$

vii) When two inductors L_1 and L_2 are connected in parallel, the equivalent inductance is

- a) L_1+L_2 ; b) between L_1 and L_2
c) less than L_1 and L_2 ; d) none of these

viii) In an LCR series ac circuit, the current is always

- a) in phase with the voltage ; b) leading with voltage
c) lagging the voltage ; d) none of the above

ix) Maxwell is unit of

- a) magnetic susceptibility ; b) intensity of magnetism
c) magnetic flux ; d) magnetic permeability

x) If the speed of an electron is 5×10^5 meter per second, how long does it take to move by one meter.

- a) 1×10^6 seconds ; b) 2×10^{-6} seconds
b) 2×10^5 seconds ; c) 1×10^{-5} seconds

Q.11a) A 4 pole DC machine is delivering 20 amps to a load of 10Ω . If the armature resistance is 0.5Ω and the shunt field resistance is 50Ω , calculate the induced e.m.f and the efficiency of the machine. Allow a drop of 1 volt per brush. 10

b) What are the properties of a good refrigerant? Why are IR changing to R 134 a? 10

Q.12 क) राजभाषा अधिनियम की धारा 3(3) में शामिल किये गये दस्तावेजों के नाम लिखें। 5

ख) हिन्दी दिवस कब और क्यों मनाया जाता है ? 5

ग) राजभाषा अधिनियम के अनुसार ओडिशा किस क्षेत्र में आता है ? ओडिशा स्थित क्षेत्र में एक त्रिभाषा में साईनबोर्ड लिखते समय क्या क्रम होना चाहिये? 5

घ) Write down the correct answer only :- 5

i) Height of the regulated OHE at level crossing is m.

ii) The purpose of issue of power plan is

- a) to ensure proper working of a goods train.
b) to allot no. of locomotives to divisions.
c) to plan man and motive power requirement.
d) none of the above.

iii) RAM is the

- a) slowest memory ; b) fastest memory
c) random memory ; d) right access memory

iv) Priming is required for type of pump.

v) Which of the following class of insulation has got the maximum permissible withstand temperature ?

- a) Y ; b) B ; c) H ; d) C

~~4/12~~ 4/12

$\frac{10}{5 \times 10^5}$
 2×10^{-6}