MEGA MOCK CHALLENGE

gradeup

# UPPSC AE 2020 PAPER-1

## Electrical Engineering

## Mega Mock Challenge
(May 16- May 17 2020)

## Questions & Solutions

1. '**शक्ति की उपासना करने वाले**' को क्या कहते है? सही विकल्प बताइए -

A. शैव
B. वैष्णव
C. शाक्त
D. नाथपंती

Ans. C

Sol. एकार्थी शब्द का अर्थ: जिन शब्दों का प्रयोग अनेक शब्दो के स्थान पर किया जाए उन शब्दों को एकार्थी शब्द कहते है।

'शक्ति की उपासना करने वाले' को **शाक्त ( शक्ति संबंधी )** कहते है।

अन्य शब्दों के अर्थ -

नाथपंती - नाथ पंथ का अनुयायी।

वैष्णव - विष्णु का उपासक

शैव - शिव के उपासक या भक्त

2. अशुद्ध विकल्प चुनिए :

A. जो कम बोलने वाला हो – अल्पभाषी
B. जो प्रमाण से सिद्ध न हो – प्रमाण्य
C. जो किसी पर अभियोग लगाए – अभियोगी
D. वर्षा का बिलकुल न होना – अनावृष्टि

Ans. B

Sol. जो प्रमाण से सिद्ध न हो वाक्य के शुद्ध शब्द अप्रमेय होता है

प्रमाण्य का अर्थ - जो सर्वमान्य हो

अन्य शब्द के अर्थ सही है –

जो कम बोलने वाला हो – अल्पभाषी

जो किसी पर अभियोग लगाए – अभियोगी

वर्षा का बिलकुल न होना – अनावृष्टि

3. न सावन सूखे न भादो हरे " कहावत का अर्थ है –

A. सुख – दुःख का भेद न जानना
B. हमेशा एक ही मानसिक स्थिति में होना
C. सदैव दुखी रहना
D. थोड़े में खुश रहना

Ans. B

Sol. न सावन सूखे न भादो हरे - हमेशा एक ही मानसिक स्थिति में होना

4. पिता के लिए उसकी पुत्री आँखों का तारा होती है। रेखांकित मुहावरे का अर्थ क्या अर्थ है?

A. बहुत बुद्धिमान
B. बहुत प्रिय
C. बहुत भाग्यशाली
D. बहुत समझदार

Ans. B

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

5. शुद्ध वर्तनी का चयन कीजिए-

A. कल्यान
B. प्रतिग्या
C. योग्य
D. कलस

Ans. C

Sol. वर्तनी - भाषा की वर्तनी का अर्थ उस भाषा में शब्दों को वर्णों से अभिव्यक्त करने की क्रिया को कहते हैं।

दिए गए विकल्पों में योग्य शब्द की वर्तनी शुद्ध है अन्य विकल्पों की वर्तनी अशुद्ध है।

शुद्ध वर्तनी - अशुद्ध वर्तनी

कल्याण - कल्यान

प्रतिज्ञा - प्रतिग्या

कलश - कलस

6. निम्नांकित विकल्पों में से कौन-सा '**तामसिक**' का विलोम शब्द है? सही विकल्प बताइए।

A. तामसक
B. सात्विक
C. तिमिर
D. तिक्त

Ans. B

Sol. विलोम शब्द - ऐसे शब्द जिनके अर्थ विपरीतया उल्टा हों, उन शब्दों को विलोम शब्द कहते हैं।

दिए गए शब्दों में **तामसिक** का विलोम शब्द **सात्विक** है।

तामसिक शब्द का अर्थ अंधकार संबंधी, तमोगुण संबंधी से है तथा सात्विक का अर्थ सत्त्वगुण संपन्न सम्बंधित होता है।

अन्य शब्दों के अर्थ -

तिमिर - अँधेरा

तिक्त - जिसका स्वाद चिरायते या नीम जैसा हो।

7. निम्नांकित विकल्पों में से कौन-सा 'तद्भव' शब्द है? सही विकल्प बताए।

A. रात्रि
B. वेदना
C. लोमश
D. बिजली

Ans. D

Sol. तद्भव= तत्+भाव जिसका अर्थ है विकसित या उससे उत्पन्न होना। अर्थात वे शब्द जो संस्कृत या उससे उत्पन्न हुए हैं। या ऐसे संस्कृत शब्द जो कुछ रूप परिवर्तन के साथ हिंदी शब्दावली में आ गए।

तत्सम= तत+सम= उसके समान अर्थात ऐसे शब्द जो संस्कृत से हिंदी में आये और ज्यों के त्यों रहे, तत्सम शब्द कहलाते हैं।

बिजली शब्द तद्भव शब्द है अन्य विकल्पो का तत्सम रूप दिया गया है।

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

तत्सम शब्द – तद्भव शब्द

रात्रि – रात

वेदना – बेदना

लोमश – लोमड़ी

विद्युत – बिजली

8. निम्न में से किस शब्द में "**प्रति**" उपसर्ग का प्रयोग किया गया है?

A. परिक्रमा B. प्रख्यात

C. प्रत्येक D. प्रकृति

Ans. C

Sol. उपसर्ग दो शब्दों से मिलकर बना होता है उप+सर्ग। उप का अर्थ होता है समीप और सर्ग का अर्थ होता है सृष्टि करना।

उपसर्ग वे शब्द हैं जो अन्य शब्दों के पहले जोड़े जाते हैं और जुड़कर उनके अर्थ में वैशिष्ट्य ला देते हैं।

उपसर्ग + अन्य शब्द = नया शब्द

दी गए विकल्पों में प्रति उपसर्ग का प्रयोग – प्रत्येक शब्द में किया गया है अन्य शब्दों में प्रति उपसर्ग नहीं है

प्रत्येक – प्रति + एक

प्रख्यात = प्र + ख्यात

परिक्रमा = परि + क्रमा

प्रकृति = प्र + कृति

9. निम्न में से किस शब्द में "**हम**" उपसर्ग का प्रयोग नहीं हुआ है?

A. हमराह B. हमउम्र

C. हरसाल D. हमदम

Ans. C

Sol. **उपसर्ग** दो शब्दों से मिलकर बना होता है उप+सर्ग। उप का अर्थ होता है समीप और सर्ग का अर्थ होता है सृष्टि करना।

उपसर्ग वे शब्द हैं जो अन्य शब्दों के पहले जोड़े जाते हैं और जुड़कर उनके अर्थ में वैशिष्ट्य ला देते हैं।

उपसर्ग + अन्य शब्द = नया शब्द

**हरसाल** शब्द में हम उपसर्ग का प्रयोग नहीं हुआ है।

हमराह – हम + राह

हमउम्र – हम + उम्र

हरसाल – हर + साल

हमदम – हम + दम

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

10. 'अध्ययन' के संधि-विच्छेद का सही विकल्प कौन-सा है?

A. अध्य + यन
B. अधि + यन
C. अधि + अयन
D. अध् + अयन

Ans. C

Sol. संधि – दो वर्णों के मेल को संधि कहते है।

अध्ययन = अधि + अयन (यण संधि)

नियम - इ या ई के बाद कोई अन्य स्वर आए तो इ या ई 'य्' में बदल जाता है और अन्य स्वर य् से जुड़ जाते हैं।

व्यंजन संधि - व्यंजन का व्यंजन से अथवा किसी स्वर से मेल होने पर जो परिवर्तन होता है उसे व्यंजन संधि कहते हैं।

11. **विषधर** में कौन सा समास है?

A. कर्मधारय तत्पुरुष समास
B. संप्रदान तत्पुरुष समास
C. अव्ययीभाव समास
D. बहुव्रीहि समास

Ans. D

Sol. समास - समास का तात्पर्य है 'संक्षिप्तीकरण'। दो या दो से अधिक शब्दों से मिलकर बने हुए एक नवीन एवं सार्थक शब्द को समास कहते हैं।

विषधर = विष को धारण करने वाला (सर्प)

बहुव्रीहि समास - इस समास में कोई भी पद प्रधान न होकर अन्य पद प्रधान होता है विग्रह करने पर नया शब्द निकलता है।

12. निम्न में से किस शब्द की संधि शुद्ध है –

A. ततैव - तत + एव
B. महौषद - महा + ओषध
C. ज्ञानोपदेश - ज्ञान + ओपदेश
D. यथोचित - यथा + ऊचित

Ans. A

Sol. तत + एव : ततैव (अ + ए = ऐ)

महा + औषध : महौषद (आ + औ = औ)

ज्ञान + उपदेश : ज्ञानोपदेश (अ + उ = ओ)

यथा + उचित – यथोचित ( अ + उ = ओ)

13. यशोदा हरि पालने झुलावे, हलरावे दुलराय मल्हावे, जोई सोई कछू गावे"

इन पंक्तियों में कौन सा रस है ?

A. शांत रस
B. वत्सल रस
C. रौद्र रस
D. करुण रस

Ans. B

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. यशोदा हरि पालने झुलावे,हलरावे दुलराय मल्हावे,जोई सोई कछू गावे" पंत्ति से यशोदा जी के द्वारा कृष्ण को झुला झुलाना और खिलाना और गीत गाने का भाव प्रस्तुत है जिससे श्रोता के मन में एक बचपन की झलक उत्पन्न होती है अत: पंत्ति में वत्सल रस है।

वत्सल रस - वत्सल रस का स्थायी भाव वात्सल्यता होता है वत्सल रस में माता का पुत्र के प्रति प्रेम, बड़ों का बच्चों के प्रति प्रेम, और यही स्नेह और प्रेम का भाव वात्सल्य रस कहलाता है।

14. निम्नलिखित में कौनसा शब्द स्त्रीलिंग नही है।

A. झुरमुट
B. अंत्येष्टि
C. इच्छा
D. उपासना

Ans. A

Sol. प्राणीवाचक शब्द हमेशा पुरुष जाति का ही बोध करते हैं। जैसे बालक, गीदड़, कौआ, कवि, साधु, खटमल आदि अतः झुरमुट एक पुल्लिंग है।

15. **'नारी'** शब्द का बहुवचन क्या होगा ?

A. नारीएँ
B. नारियाँ
C. नारीओ
D. नारी

Ans. B

Sol. इकारांत या ईकारांत स्त्रीलिंग शब्दों के अंत में 'याँ' शब्द लगा देने से और दीर्घ ई को ह्रस्व इ कर देने शब्द बहुवचन में बदल जाता है। जैसे नारी-नारियाँ, नीति-नीतियाँ आदि।

16. "मै राम के घर पहुंचा परन्तु वह स्कूल जा चुका था" इस वाक्य में कौन सा विराम चिन्ह लगेगा?

A. ( , )
B. ( : )
C. ( ; )
D. ( ` )

Ans. A

Sol. विराम चिन्ह - विराम का अर्थ होता है विश्राम या रूकना। अथार्त वाक्य लिखते समय विराम को प्रकट करने के लिए लगाये जाने वाले चिन्ह को ही विराम चिन्ह कहते हैं।

वाक्य में प्रयुक्त होने वाले अव्ययों किन्तु, परन्तु, पर, लेकिन, आदि के पहले अल्प विराम लगते है ।

जैसे - मै राम के घर, पहुंचा परन्तु वह स्कूल जा चुका था

17. निम्न में से सघोष वर्ण हैं।

A. क,ग
B. ट,ड,ण
C. द,ध,न
D. फ,ब,भ

Ans. C

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. वर्ण - हिन्दी भाषा में प्रयुक्त सबसे छोटी इकाई वर्ण कहलाती है। सघोष वर्ण - जिन वर्णों के उच्चारण में केवल नाद का उपयोग होता है, उन्हे घोष या सघोष वर्ण कहते हैं। इनकी संख्या 31 होती है। इसमें सभी स्वर अ से ओ तक और

ग, घ, ङ

ज, झ, ञ

ड, ढ, ण

द, ध, न

ब, भ, म

य, र, ल, व, ह

18. दिए गए वाक्य में (**हमारी**)रेखांकित शब्द का पुरुष ज्ञात कीजिए ।

बारिश में **हमारी** पुस्तकें भीग गई ।

A. उत्तम पुरूषवाचक
B. माध्यम पुरूषवाचक
C. प्रथम पुरूषवाचक
D. अन्य पुरूषवाचक

Ans. A

Sol. उत्तम पुरूषवाचक - जिन सर्वनामों का प्रयोग बोलने वाला अपने लिए करता है, उन्हें उत्तम पुरुषवाचक कहते है।

जैसे- मैं, हमारा, हम, मुझको, हमारी

बारिश में हमारी पुस्तकें भीग गई । वाक्य में हमारी शब्द का प्रयोग करके खुद के बारे में बता रहा है। अतः ये शब्द उत्तम पुरुष की श्रेणी में आयेंगे।

मध्यम पुरुषवाचक - जिन सर्वनामों का प्रयोग सुनने वाले के लिए किया जाता है, उन्हें मध्यम पुरुषवाचक कहते है।

जैसे- तू, तुम, तुम्हे, आप, तुम्हारे, तुमने, आपने आदि।

अन्य पुरुषवाचक - जिन सर्वनाम शब्दों का प्रयोग किसी अन्य व्यक्ति के लिए किया जाता है, उन्हें अन्य पुरुषवाचक कहते है।

जैसे- वे, यह, वह, इनका, इन्हें, उसे, उन्होंने, इनसे, उनसे आदि।

19. दिए गए वाक्य में (सुंदरता) रेखांकित शब्द की संज्ञा ज्ञात कीजिए ।

ताजमहल की **सुंदरता** का वर्णन करना बहुत ही कठिन है ।

A. द्रव्यवाचक संज्ञा
B. व्यक्तिवाचक संज्ञा
C. भाववाचक संज्ञा
D. समुदायवाचक संज्ञा

Ans. C

Sol. भाववाचक संज्ञा - जो शब्द किसी चीज़ या पदार्थ की अवस्था, दशा या भाव का बोध कराते हैं, उन शब्दों को भाववाचक संज्ञा कहते हैं।

जैसे- बचपन, बुढ़ापा, मोटापा, मिठास, उमंग, चढाई, सुन्दरता आदि।

ताजमहल की सुंदरता का वर्णन करना बहुत ही कठिन है ।

सुंदरता शब्द से सुंदर होने के भाव का बोध हो रहा है। अतः सुंदरता एक भाववाचक संज्ञा शब्द है।

**Electrical Engineering Exams**
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

20. "**अव्यय**" शब्द के कितने भेद होते है?

A. 2 B. 3

C. 4 D. 5

Ans. C

Sol. अव्यय का शाब्दिक अर्थ होता है – जो व्यय न हो। जिनके रूप में लिंग , वचन , पुरुष , कारक , काल आदि की वजह से कोई परिवर्तन नहीं होता उसे अव्यय शब्द कहते हैं।

अव्यय का मूल रूप स्थिर रहता है,कभी बदलता नहीं है। जैसे – आज, काल, किन्तु, परन्तु

अव्यय के भेद :-

1) क्रिया-विशेषण अव्यय – धीरे – धीरे, प्रतिदिन

2) संबंधबोधक अव्यय – आगे, पीछे

3) समुच्चयबोधक अव्यय – और, जो ...तो,यदि...तो

4) विस्मयादिबोधक अव्यय – वाह!, आह!

21. निम्न में से **शुद्ध वाक्य** है।

A. मै रात में बाजार घुमने गया था B. मैने रात में बाजार घुमने गया था

C. में रात में बाजार घुमने गया था D. मै रत में बाजार घुमने गया था

Ans. A

Sol. वाक्य - दो या दो से अधिक शब्दों के सार्थक समूह को वाक्य कहते हैं।

"मै रात में बाजार घुमने गया था" वाक्य सही है अन्य विकल्प अशुद्ध है।

22. ठंडा दूध पीना लाभदायक होता है" में कौन-सा विशेषण है -

A. संख्यावाचक विशेषण B. गुणवाचक विशेषण

C. परिमाण वाचक विशेषण D. सार्वनामिक विशेषण

Ans. B

Sol. जिस विशेषण से किसी संज्ञा सर्वनाम का गुण प्रकट हो, उसे गुणवाचक विशेषण कहते है। इसके अंतर्गत :- गुण: अच्छा,चालक,बुद्धिमान आदि दोष:: बुरा,गंदा,दुष्ट आदि रंग: काला,लाल आदि आकार: लंबा,छोटा,गोल आदि अवस्था: बीमार,घायल आदि स्थान: पंजाबी,भारतीय,बंगाली आदि आते है।

23. मेरे से मत पूछो दिये गये वाक्य में किस प्रकार की अशुद्धी है?

A. संज्ञा संबंधी अशुद्धी B. लिंग संबंधी अशुद्धी

C. सर्वनाम संबंधी अशुद्धी D. कारक संबंधी अशुद्धी

Ans. C

Sol. मेरे से मत पूछो इस वाक्य में सर्वनाम संबंधी अशुद्धी है क्योंकि मेरे से के स्थान पर मुझसे सर्वनाम आएगा ।

वाक्य रचना में संज्ञा , सर्वनाम, विशेषण, क्रिया , अव्यय, से संबंधित या अन्य प्रकार की अशुद्धी हो सकती है ।

**Electrical Engineering Exams**

Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

24. "हो सकता है राजेश आ जाये।" वाक्य है –

A. संदेहवाचक
B. विस्मयवाचक
C. निषेधवाचक
D. विधानवाचक

Ans. A

Sol. जिन वाक्यों से संदेह या संभावना का ज्ञान हो उन्हें संदेहवाचक वाक्य कहते है।
जैसे - हो सकता है आज बारिश हो।

25. राम खाकर खेलने लगा। में कौनसी क्रिया है?

A. पूर्वकालिक
B. सहायक
C. संयुक्त
D. इनमें से कोई नहीं|

Ans. A

Sol. दिए गए वाक्य **राम खाकर खेलने लगा** में पूर्वकालिक क्रिया है। जब KARTA एक क्रिया को संपन्न करके तत्काल दूसरी क्रिया को आरंभ कर देता है तो वहाँ पूर्वकालिक क्रिया होती है। जैसे- वह गाकर सो गया।

26. Evaluate the integral:

$$I = \int_{-3}^{+3} t[\delta(t) + \delta(t-2) + \delta(t-5)]dt$$

A. 0
B. 1
C. 2
D. 3

Ans. C

Sol. Property

$$I = \int_{-\infty}^{+\infty} f(t)\delta(t-t_0)dt = f(t_0), -\infty < t_0 < +\infty$$

$$\therefore I = \int_{-\infty}^{+\infty} f(t)\delta dt + \int_{-3}^{+3} t\delta(t-2)dt + \int_{-3}^{+3} t\delta(t-5)dt$$

$I = 0 + 2 + 0 = 2$

27. Which of the following factors will be helpful in reducing corona loss?

A. Rough surface of conductor
B. Increasing frequency
C. Dusty atmosphere
D. Bundle conductors

Ans. D

Sol. Bundle conductor increases the effective diameter of the conductor. Resulting in low corona loss.

28. Fault in a power system is a

A. High frequency and highly leading phenomenon
B. High frequency and highly lagging phenomenon
C. Low frequency and highly leading phenomenon
D. Low frequency and highly lagging phenomenon

Ans. B

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. * The load on the machine is suddenly reduce due to fault. So, frequency is increased.

* Since fault current is limited by line reactance only. Fault current becomes highly lagging.

29. What will be the no. of transmission line in a 100 bus power system having 80% sparsity.

A. 750 B. 950

C. 850 D. 650

Ans. B

Sol. Total elements in Y-bus matrix = 100 × 100

= 10000

Non zero diagonal element = 100

% sparsity = 80%

Total no of "zero" elements =

$$\Rightarrow 10000 \times \frac{80}{100}$$

⇒ 8000

Total no of non-zero element

= (10000 – 8000)

= 2000

Non zero off diagonal elements

= (2000 – 100)

= 1900

No of transmission lines =

$$\frac{\text{Non zero off diagonal elements}}{2} = \frac{\text{Non zero off diagonal elements}}{2}$$

= 950

30. Series capacitor compensation is used in transmission lines to

A. Reduce corona loss B. Compensate Ferranti effect

C. Reduse the voltage profile D. Improve power transfer capability

Ans. D

Sol. $P = \frac{EV}{X}\text{Sin}\delta$

By using series capacitor compensation X will decrease & P will increase.

31. In a region $\bar{D} = x\hat{a}_z + y\hat{a}_y + z\hat{a}_z\ C/m^2$. The flux radiating out of a sphere of radius 1 m centered at the origin is:

A. π/2 Coulombs B. π Coulombs

C. 2π Coulombs D. 4π Coulombs

Ans. D

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. $\bar{D} = x\hat{a}_z + y\hat{a}_y + z\hat{a}_z$

$$\nabla.\bar{D} = \frac{\partial}{\partial x}Dx + \frac{\partial}{\partial y}Dy + \frac{\partial}{\partial z}Dz$$

$$\nabla.\bar{D} = 1 + 1 + 1 = 3$$

We know that,

$\nabla \cdot D = \rho_v$

$\therefore \rho_v = 3$

From gauss Law

$$\phi_{net} = Q_{enclosed} = \int_V \rho_v dv$$

$Q_{enclosed} = e_v \times$ volume of the sphere

$$Q_{enclosed} = e_v \times \frac{4}{3}\pi r^3$$

$$= 3 \times \frac{4}{3}\pi r^3$$

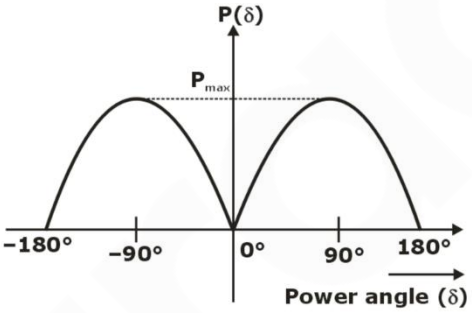
$Q_{enclosed} = 4\pi r^3 c$

Given r = 1m

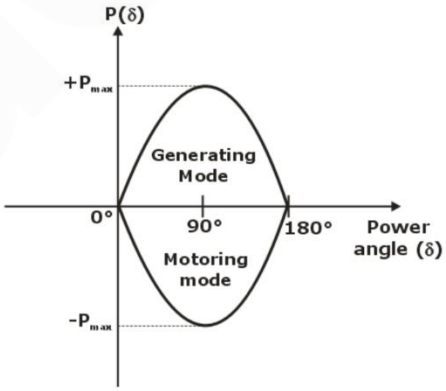
$\therefore Q_{enclosed} = 4\pi$ C

32. Which one of the following graph depicts the power angle characteristics of the cylindrical rotor machines?

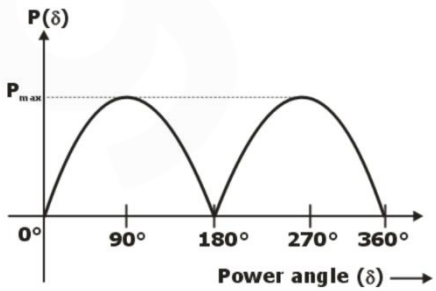
A.



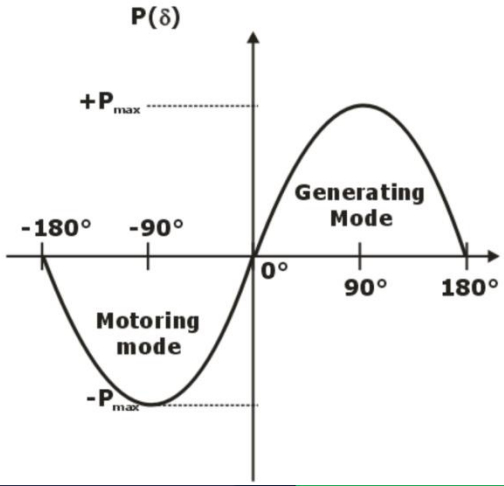

B.




C.




D.




Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Ans. D

Sol. For cylindrical rotor machines:

Output power equation is

$P_e = P_{max} \sin\delta$

33. In a half-wave rectifier, if an a.c. supply is 60Hz, then what is the a. c. ripple at output?

A. 30 Hz

B. 60Hz

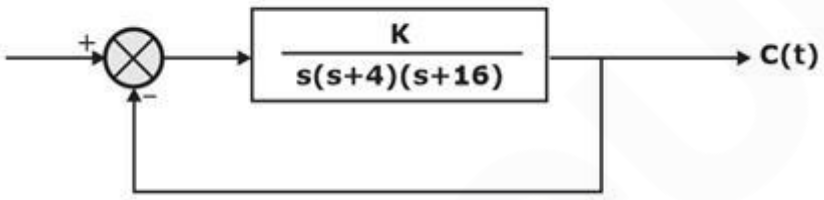
C. 120 Hz

D. 15 Hz

Ans. B

Sol. In case of HWR, frequency of a.c. ripple will be same as input signal frequency.

34. By a suitable choice of the scalar parameter K, the system shown in figure below can be made to oscillate continuously at a frequency of:




A. 8 rad/sec

B. 4 rad/sec

C. 2 rad/sec

D. $4\sqrt{2}\text{rad / sec}$

Ans. A

Sol. Characteristic equation,

$1 + G(s) = 0$

$$1 + \frac{K}{s(s+4)(s+16)} = 0$$

$s(s + 4)(s + 16) + k = 0$

$s^3 + 20s^2 + 64s + K = 0$

Forming Routh Array,

$s^3$ 1 64

$s^2$ 20 K

$$s^1 \quad \frac{1280 - K}{20}$$

$s^0$ k

$$\frac{1280 - K}{20} = 0$$

$K = 1280$

For Oscillatory system

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Auxially equation will be,

$A(s) = 20s^2 + 1280 = 0$

Put $s = jw$, $20 (jw)^2 + 1280 = 0$

$$w^2 = \frac{1280}{20} = 64$$

$w = 8$ rad/sec

35. Which statement is NOT true about solar energy?

A. Solar energy can only be harnessed in day time

B. Large area of land is required.

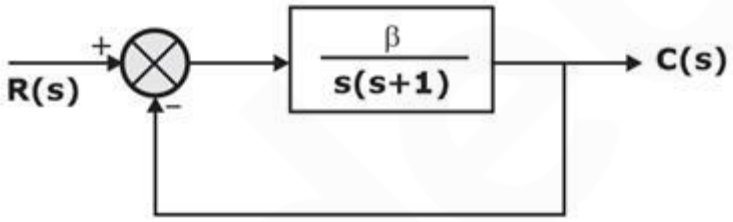
C. It is a cheap source of energy.

D. It is a renewable form of energy.

Ans. C

Sol. Solar energy harnessing is not cheap but costly as large no of PV cells are required.

36. For the Block diagram given below. Determine the sensitivity $S_\beta^T$.




A. $\frac{s(s+1)}{s(s+1)+s\beta}$

B. $\frac{(s+1)}{s(s+1)+\beta}$

C. $\frac{(s+1)}{(s+1)+s\beta}$

D. $\frac{s(s+1)}{s(s+1)+\beta}$

Ans. D

Sol. $$T(s) = \frac{C(s)}{R(s)} = \frac{\frac{\beta}{s(s+1)}}{1+\frac{\beta}{s(s+1)}}$$

$$T(s) = \frac{\beta}{s(s+1)+\beta} = \frac{\beta}{s_2+s+\beta}$$

$$S_\beta^T = \frac{\partial T}{T} / \frac{\partial \beta}{\beta} = \frac{\partial T}{\partial \beta} \times \frac{\beta}{T} \ldots\ldots (i)$$

$$\frac{\partial T}{\partial \beta} = \frac{\partial}{\partial \beta}\left[\frac{\beta}{s^2+s+\beta}\right]$$

$$= \frac{s(s+1)}{(s^2+s+\beta)^2}$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Eqn (i)

$$S_{\beta}^{T} = \frac{s(s+1)}{(s^2+s+\beta)^2} \times \frac{\beta}{\frac{\beta}{(s^2+s+\beta)}}$$

$$\text{Sensitivity} = \frac{s(s+1)}{s(s+1)+\beta}$$

37. Match the following:

| List A | List B |
|---|---|
| a. Foster's form | 1. Band stop Filler |
| b. Foster's 2nd form | 2. High pass filter |
| c. Caucer's form | 3. Band pass filter |
| d. caucer's 2nd form | 4. Low pass filter |

A. (a – 3), (b – 4), (c – 1), (d – 2)
B. (a – 3), (b – 1), (c – 4), (d – 2)
C. (a – 2), (b – 1), (c – 4), (d – 3)
D. (a – 2), (b – 4), (c – 1), )d – 3)

Ans. B

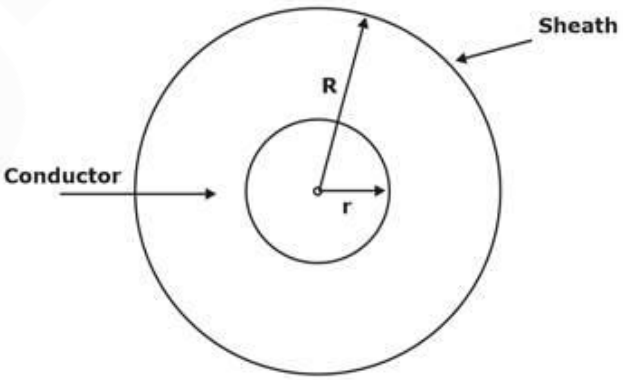
Sol. Foster's first form is useful for Band pass filter.
Foster's 2nd form is useful for Band stop filter.
Causer's first form is useful law pass filter.
Causer's second form is useful for high pass filter.

38. The electrostatic stress in a cable is
A. Maximum at conductor surface and minimum at sheath.
B. Minimum at conductor surface and maximum at sheath
C. Same throughout the insulation
D. None of the above

Ans. A

Sol. $E = \frac{\lambda}{2\pi\varepsilon} \Rightarrow E\alpha\frac{1}{x}$

E (electrostatic stresses) decrease with increase in distance (x).
So at x = r (conductor's surface), it is maximum.
At x = R (on sheath), it is minimum.




Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

39. The steady state error due to step input for type-1 system is

A. ∞ B. 0

C. 1 D. None of the above

Ans. B

Sol. Type -1, $\frac{k}{s(s+a)}$ and step input $=\frac{1}{s}$

$$E_{ss}=\lim_{s\to 0}\frac{(s)[R(s)]}{1+G(s)H(s)}=\lim_{s\to 0}\frac{(s)\left(\frac{1}{s}\right)}{1+\frac{k}{s(s+a)}}=0$$

Ess = 0

40. If Short Circuit ratio (SCR) of three phase alternator is high then –

A. Synchronous reactance ($X_s$) would be low and maximum power output ($P_{max}$) would be high

B. maximum power output ($P_{max}$)would be low and synchronous reactance (Xs) would be high

C. Both maximum power output ($P_{max}$)and synchronous reactance ($X_s$) would be high

D. Both maximum power output ($P_{max}$) and synchronous reactance ($X_s$) would be low.

Ans. A

Sol. Short Circuit Ratio (SCR) is inversely proportional to $X_s$

i.e. SCR $\propto \frac{1}{Xs}$

$$X_s \propto \frac{1}{SCR}$$

∴ if SCR is high then synchronous reactance will be low.

Maximum power output is given by,

$$P_{max}=\frac{EV}{Xs}$$

$P_{max} \propto 1/X_s$

i.e. if $X_s$ would be low then $P_{max}$ would be high.

41. Two charges are placed a a distance apart. Now, if a glass slab is inserted between them, then the force between the charges will

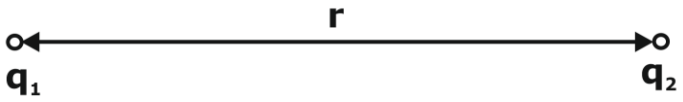
A. reduce to zero B. increase

C. decrease D. not charge

Ans. C

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol.




Force between charges

$$F = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}$$ (in free space)

If glass slab is inserted between charges then

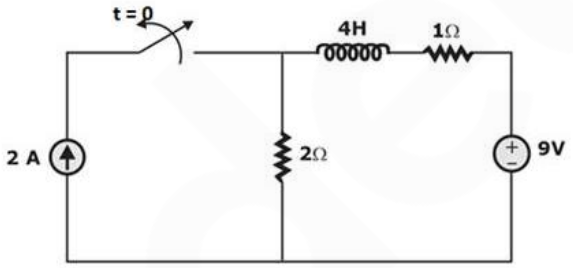
$$F = \frac{1}{4\pi\varepsilon_0\varepsilon_r}\frac{q_1 q_2}{r^2}$$

$$F' = \frac{F}{\varepsilon_r}$$

as $\varepsilon_r \geq 1$

$\therefore$ force decreases

42. In the circuit shown below

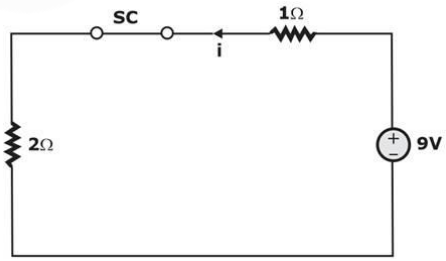



The switch is opened at t = 0. The energy stored in the inductor at steady state is.

A. 15 J
B. 18 J
C. 9 J
D. 27 J

Ans. B

Sol. At t = ∞ in steady state condition




$$I(\infty) = \frac{9}{3} = 3A$$

$$E(\text{Steady state}) = \frac{1}{2}LI^2$$

$$= \frac{1}{2} \times 4 \times 9 = 18J$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

43. A 40 MVA, 33 KV/132 kV, Δ-Y connected 3-phase transformer has reactance X = 0.05 pu. The actual value of X referred to low voltage side is

A. 1.36 Ω
B. 4.08 Ω
C. 5.28 Ω
D. 2.36 Ω

Ans. B

Sol. Given X = 0.05 pu

At low voltage side, (33 KV/132 kV)

(Delta-star connection) → primary is Delta connected

$$Z_B = \frac{3V_B^2}{V_A} \text{ or } \frac{3(KV_B)^2}{MVA}$$

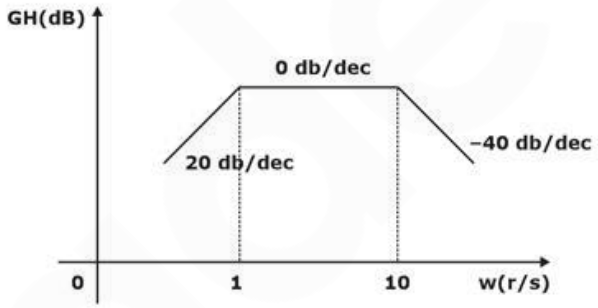
$$Z_B = \frac{3\times(33)^2}{40} = 81.675$$

$X_{actual} = Z_B \times Xpu$

$= 81.675 \times 0.05$

$= 4.084\ \Omega$

44. Which of the following TF represents the Bode plot as shown in the Figure.




A. $\frac{K}{(s+1)(s+10)^2}$
B. $\frac{Ks^2}{(s+1)(s+10)^2}$
C. $\frac{Ks}{(s+1)(0.1s+1)^2}$
D. $\frac{Ks^2}{(s+1)(0.1s+1)^2}$

Ans. C

Sol. In a bode magnitude plot, a pole adds a slope of -20 dB/dec whereas a zero adds a slope of 20 dB / dec.

Initial slop of Bode plot is + 20 dB/dec.

∴ at w = 1, pole of order 1

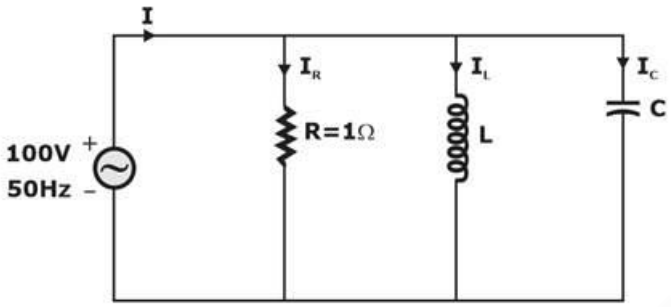
At w = 10, pole of order 2

$$\therefore T.F = \frac{Ks}{(1+s)\left(1+\frac{s}{10}\right)^2} = \frac{Ks}{(s+1)(0.1s+1)^2}$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

45. Given parallel RLC circuit is in resonance condition. What will be the selectivity of the given circuit?

$|I_L| = |I_C| = 1500$ A




A. 10 B. 15

C. 20 D. 25

Ans. B

Sol. Quality factor is a measure of selectivity.

At resonance in parallel circuit,

$$Q = \frac{I_L}{I_R}$$

$$I_R = \frac{100}{1} = 100A$$

$$Q = \frac{1500}{100} = 15$$

46. A generating station supplies the following loads 15000KW, 12000KW, 8500KW, 6000KW and 450KW. The station has maximum demand of 22000KW. Calculate the diversity factor.

A. 1.91 B. 0.52

C. 0.68 D. 1.34

Ans. A

Sol. $\text{Diversity factor} = \frac{\text{Sum of individual demand of consumers}}{\text{Max demand of station}}$

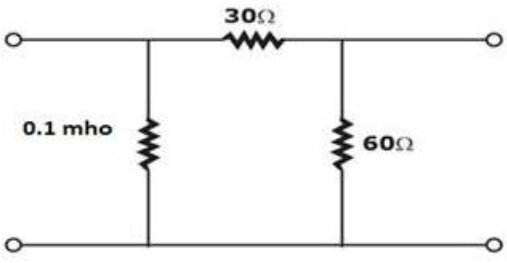
$$= \frac{15000 + 12000 + 8500 + 6000 + 450}{22000}$$

= 1.9068

≃ 1.91

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

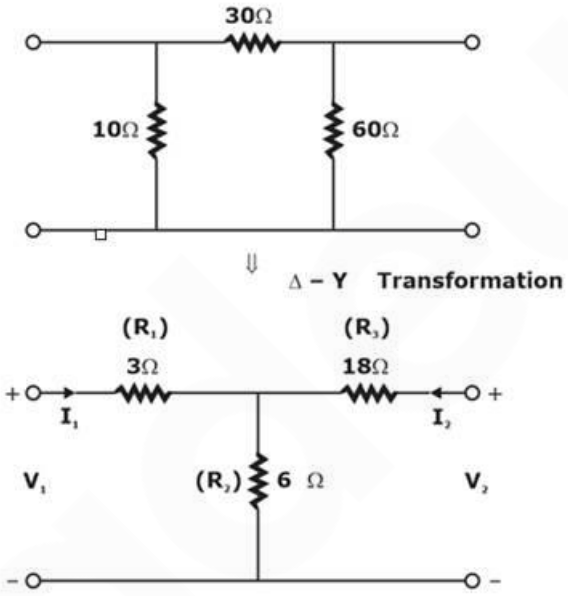
47. For the two part Network shown here. Find the values of $Z_{22}$ & $Z_{21}$.




A. 6 Ω and 12 Ω
B. 9 Ω and 24 Ω
C. 6 Ω and 24 Ω
D. 30.03 and 12 Ω

Ans. C

Sol. Given circuit




We know that

For T Network

$$[Z] = \begin{bmatrix} (R_1 + R_2) & R_2 \\ R_2 & (R_2 + R_3) \end{bmatrix} = \begin{bmatrix} 9 & 6 \\ 6 & 24 \end{bmatrix}$$

$Z_{21} = 6$

$Z_{22} = 24$

48. Which of the following statement is NOT correct?

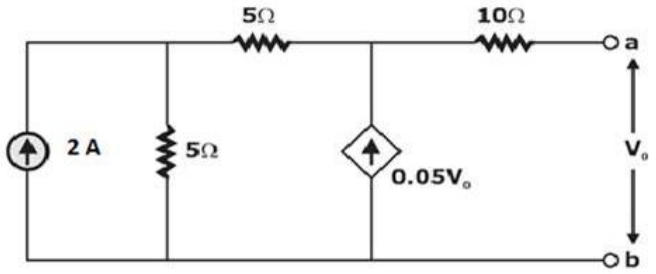
A. Pressure coil of Dynamometer type wattmeter is highly inductive.
B. Pressure coil of an induction type energy meter is highly inductive
C. Pressure coil of Dynamometer type wattmeter is highly resistive
D. none of the above

Ans. A

Sol. Pressure coil of wattmeter is highly resistive and pressure coil of energy meter is highly inductive. So, option A is incorrect.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

49. The thevenin's equivalent parameters of the below circuit at a-b terminal is –

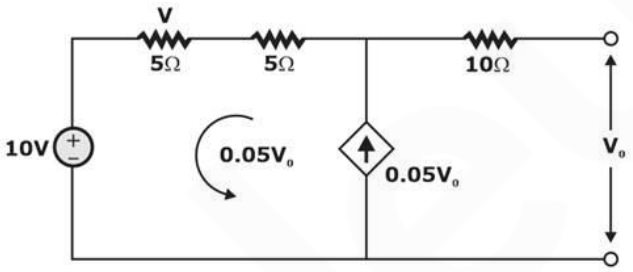



A. Vth = 20V and Rth = 40 Ω
B. Vth = 10V and Rth = 20 Ω
C. Vth = 20 Va and Rth = 20 Ω
D. Vth = 10 V and Rth = 40 Ω

Ans. A

Sol. Redrawing above circuit

Vth :

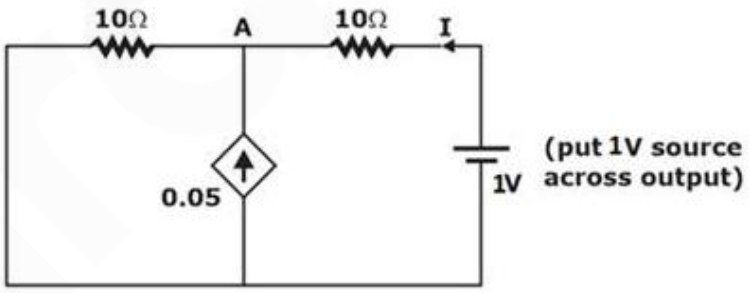



$10 + 10 (0.05 V_0) - V_0 = 0$

$10 - 0.5 V_0 = 0$

$20 = V_0$

Rth :




KCL at node A,

$$I + 0.05 = \frac{V_A}{10} = \frac{(1 - 10I)}{10}$$

$10I + 0.5 = 1 - 10 I$

$20I = 0.5$

$$\Rightarrow \frac{1}{I} \Rightarrow 40\Omega = \text{Rth}$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

50. In a synchronous generator operating at zero pf lag, the effect of armature reaction is

A. Magnetizing

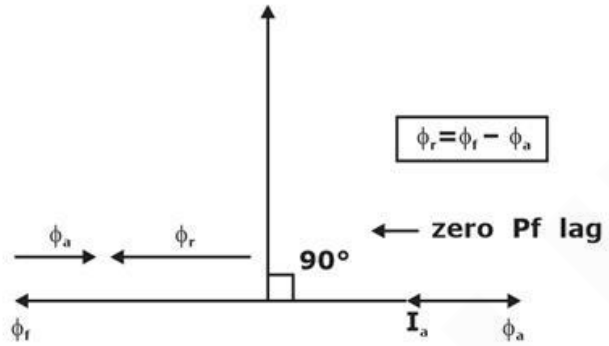
B. Demagnetizing

C. Cross- Magnetizing

D. Both Magnetizing and Cross-Magnetizing

Ans. B

Sol.




So, the nature of charactertistic is purely Demagnetizing.

51. The pu value of impedance is 0.4 pu at a base of 25 kV and 100 MVA. What will be the value of impedance at 33 kV and 100 MVA Base?

A. 0.33 pu

B. 0.23 pu

C. 0.22 pu

D. 0.32 pu

Ans. B

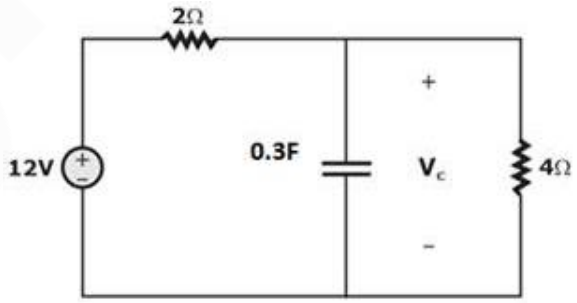
Sol. $(Z_{pu})_{new} = (Z_{pu})old \times \frac{[MVA]_{new}}{[MVA]_{old}} \times \left[\frac{(KV_b)_{old}}{(KV_b)_{new}}\right]^2$

$(Z_{pu})_{new} = 0.4 \times \frac{100}{100} \times \left(\frac{25}{33}\right)^2$

= 0.23 pu

52. Find the voltage across the capacitor at t = 0.4 sec.

Given Vc(0) = 0




A. 2.057

B. 3.057

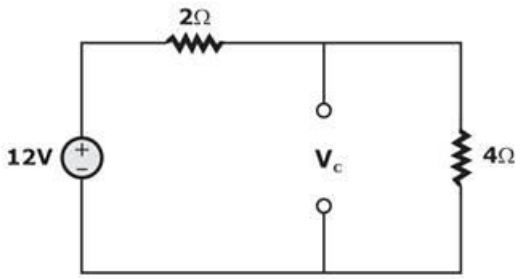
C. 5.057

D. 4.057

Ans. C

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. At (t = ∞)




$i_\infty = \frac{12}{6} = 2A$

$Vc(\infty) = 12 - 2 \times 2 = 8V$

$\therefore Vc = V\infty + (V_0 - V_\infty)\, e^{-t/\tau}$

$V_c = V_\infty (1 - e^{-t/\tau})$

$V_c = 8 (1 - e^{-t/\tau})$ .....(i)

$\tau = R_{eq}\, C = (4 \,||2)\, 0.3 = 0.4$ sec

from eqn (i)

$Vc (t = 0.4 \text{ sec}) = 8 [1 - e^{-1}]$

= 5.057 volt

53. In a parallel RLC circuit, the value of capacitor C required to achieve critical Damping is [Given L = 8 mH and R = 20 Ω]

A. 4μF B. 6μF

C. 5μF D. 10μF

Ans. C

Sol. For critical Damping, δ = 1

Damping ratio is unity

For parallel circuit

$\delta = \frac{1}{2R}\sqrt{\frac{L}{C}} = 1$

$\sqrt{\frac{L}{C}} = 2 \times 20 = 40$

$\frac{L}{C} = 1600$

$C = \frac{L}{1600} = \frac{8mH}{1600} = 5\mu F$

C = 5μF

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

54. If $B = axz\hat{i} - b^2yz\hat{j} + c\hat{k}$ represents magnetic field then –

A. 2b = a + c
B. b = a
C. $b^2$ = a
D. b = a + c

Ans. C

Sol. Gauss Law of magneto statics,

$\nabla.\bar{B} = 0$

$\bar{B} = axz\hat{i} - b^2yz\hat{j} + c\hat{k}$

$\therefore \nabla.\bar{B} = \frac{\partial}{\partial x}(axz) - \frac{\partial}{\partial y}(b^2yz) + \frac{\partial}{\partial z}(c)$

$\therefore \nabla\bar{B} = az - b^2z + 0 = 0$

$b^2$ = a

55. The making current of 3-phase breaker with rating 2000 MVA, 33KV will be.

A. 35 KA
B. 50 KA
C. 70 KA
D. 89 KA

Ans. D

Sol. Breaking current,

$I_B = \frac{S}{\sqrt{3}.V} = \frac{2000 \times 10^6}{\sqrt{3} \times 33 \times 10^3}$

$I_B$ = 34.99 KA

$I_{(making\ current)}$ = (2.55 × $I_B$)

= 2.55 × 35 KA

= 89.22 KA

Making current = 89.22 KA

56. A DC cumulatively compounded motor delivers valid load torque at rated speed. If the series field is short circuited then the armature current and speed will be respectively.

A. Both increases
B. Both decreases
C. increases and decreases
D. Decreases and increases

Ans. A

Sol. Motor is operating on rated load.

Then torque remains constant.

If series winding short circuited (φse = 0)

Net φ (flux) = φsh + φse (decreases)

For constant Torque, Armature current will increases. As Torque is proportional to the product of flux and Armature current.

$\left(\uparrow N \propto \frac{E}{\phi\downarrow}\right)$, φ reduces speed will also increase.

Hence, Both Armature current and speed will increase.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

57. If the load current is kept constant in a single phase transformer, calculate the power factor at which the maximum efficiency occurs.

A. 0.5 B. 0.1

C. 1 D. None of these

Ans. C

Sol. $\eta = V_2I_2\cos\varphi_2 / ( V_2I_2\cos\varphi_2 + I_2^2R_{e2} + P_i)$

If the load current $I_2$ is constant, $I_2^2R_{e2}$ is constant too.

Say, $I_2^2R_{e2} + P_i = k$

Hence,

$\eta = V_2I_2\cos\varphi_2 / ( V_2I_2\cos\varphi_2 + k) = 1/(1+ k/ V_2I_2\cos\varphi_2)$

Now the efficiency will be maximum if the denominator become minimum. The minimum value of denominator occurs when $\cos\varphi_2$ is maximum.

The maximum value of $\cos\varphi_2=1$.

Hence for a constant load current, maximum efficiency occurs when the load power factor is unity i.e. resistive load.

58. A single core cable has insulation resistance of 200 M Ω/Km. the insulation resistance of 10 km length is.

A. 10 M Ω B. 200 M Ω

C. 20 M Ω D. 2000 M Ω

Ans. C

Sol. $Ri\alpha\frac{1}{l}$ (inversely proportional to length of cable)

$$\frac{(Ri)_1}{(Ri)_2} = \frac{l_2}{l_1} = \frac{10km}{1km}$$

$$(Ri)_2 = \frac{200}{10} = 20M\Omega$$

59. The energy of the signal

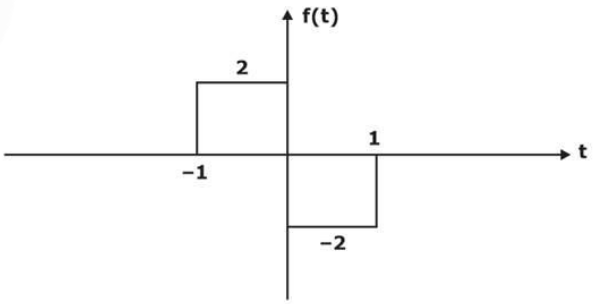
f(t) = 2 u(t + 1) – 4 u(t) + 2 u(t – 1) is

A. 4J B. 8J

C. 16 J D. 12 J

Ans. B

Sol. f(t) = 2u(t + 1) – 4u(t) + 2u(t – 1)




Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

$$E = \int_{-\infty}^{\infty} [x(t)]^2 dt = \int_{-1}^{0} (2)^2 dt + \int_{0}^{1} (-2)^2 dt$$

$= 4t\,|_{-1}^{0} + 4t\,|_{0}^{1}$

$= 4 + 4 = 8$ J

60. Which of the following is NOT the characteristics of ideal op-amp.

A. Infinite CMRR
B. High input Impedance
C. High output impedance
D. High Differential Gain

Ans. C

Sol. Op-Amp has very low output impedance. So, option 'C' is correct Answer.

61. The phase cross-over frequency of the transfer function $G(s) = \frac{10}{s(s+1)^2}$ in Hz is.

A. 1
B. $\frac{\pi}{2}$
C. $\frac{1}{2\pi}$
D. $\frac{2}{\pi}$

Ans. C

Sol. $T.F = \frac{10}{s(s+1)^2}$

For phase cross-over frequency,

$\angle G(jw) = 180°$

$G(jw) = \frac{10}{(jw)(jw+1)}$

$\angle G(jw) = -90° - 2\tan^{-1}w = -180°$

$2\tan^{-1} w = 90°$

$w = \tan 45° = 1$

$f = \frac{1}{2\pi}$ Hz

62. The loss of charge method can be used to measure which of the following?

A. Insulation resistance
B. Transformer resistance
C. Inductance
D. Capacitance

Ans. A

Sol. The loss of charge method is used to measure high value of resistance. So, it is best suitable for measurement of "Insulation Resistance".

63. If capacitor is energized by a symmetrical square wave current source, then the steady state voltage across the capacitor will be

A. Step function
B. Impulse function
C. Square wave
D. Triangular wave

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

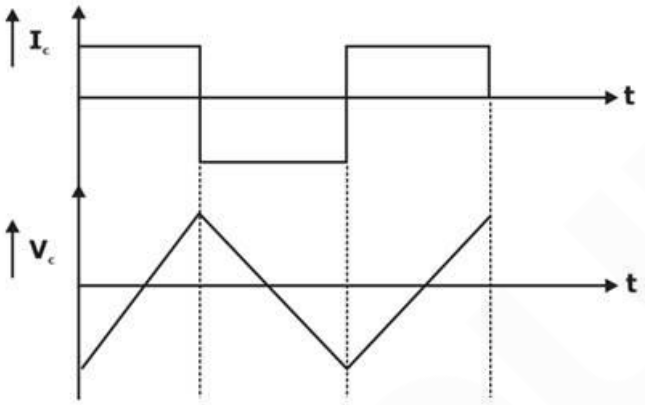
Ans. D

Sol. $I_c = C\frac{dVc}{dt}$, current across capacitor

$\therefore V_c = \frac{1}{C}\int I_c dt$

∴ Ic = square wave nature

Vc = Triangular wave nature




64. Which of the following circuits is used for converting a sine wave into a square wave?

A. Monostable multivibrator
B. Bistable multivibrator
C. Schmitt trigger circuit
D. Darlington complementary pair

Ans. C

Sol. Schmitt Trigger is used as a wave shaping circuit. It is used to convert a sine wave into a square wave by fixing the output voltage at two distinct voltage levels.

65. For a two port network to be symmetrical. The following condition will satisfy:

A. $h_{12} = -h_{21}$
B. $h_{11} = h_{22}$
C. $(h_{11}h_{22} - h_{12}h_{21}) = 1$
D. $(h_{11}h_{22} - h_{12}h_{21}) = 0$

Ans. C

Sol. The condition for symmetry is

$$\begin{vmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{vmatrix} = 1$$

$(h_{11}h_{22} - h_{21}h_{12}) = 1$

66. Two transformers when operating in parallel will share the load depending upon which of the following?

A. Magnetizing current
B. Leakage reactance
C. Per unit impedance
D. Efficiency

Ans. C

Sol. Load sharing not depend on η and magnetizing current. Equivalent impedance also have resistance so option B. Leakage reactance is also not correct.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

67. Determine the transfer function by the following difference equation:

$y[n] - 3y[n + 1] = 2x[n + 1]$

A. $\frac{5}{z^{-1} - 2}$

B. $\frac{2}{z^{-1} - 3}$

C. $\frac{2}{z - 3}$

D. $\frac{2}{z - 3z^{-1}}$

Ans. B

Sol. By applying z Transform,

$Y(z) - 3ZY(z) = 2zX(z)$

$\frac{Y(z)}{X(z)} = \frac{2Z}{1 - 3z} \Rightarrow \left(\frac{2}{Z^{-1} - 3}\right)$

68. A DC shunt generator running at 1000 rpm with critical resistance of 100 Ω. Its shunt resistance is 50 Ω then critical speed is –

A. 1000 rpm

B. 1200 rpm

C. 800 rpm

D. 500 rpm

Ans. D

Sol. Critical resistance α speed

$\frac{R_{c1}}{R_{c2}} = \frac{N_1}{N_2}$

$\frac{100}{50} = \frac{1000}{N_2} \Rightarrow N_2 = 500\text{rpm}$

69. An overhead line having a surge impedance of 800 Ω is connected in series with an underground cable having a surge impedance of 200 Ω. If a surge of 50 kV travels from the line end towards the line cable junctions, the value of the transmitted voltage wave at the junction is.

A. 20 kV

B. 40 kV

C. 10 kV

D. 15 kV

Ans. A

Sol. $(Zs)_{OH} = 800\ \Omega = Z_C$

$(Z_S)_{UC} = 200\ \Omega = Z_L$

$V = 50\text{kV}$

Transmitted voltage $= V \times \left(\frac{2Z_L}{Z_L + Z_C}\right)$

$= 50\text{kV} \times \left(\frac{400}{1000}\right)$

$= 20$ kV

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

70. If the span of a transmission line is increased by 10%, the sag of line.

A. Decreases by 21%
B. Increases by 10%
C. Increases by 21%
D. Decreases by 10%

Ans. C

Sol. $\text{Sag} = \frac{WL^2}{8T}$ L → span of line

T → Tension

$L_2 = 1.1\ L_1$

$\therefore \frac{S_1}{S_2} = \frac{L_1^2}{L_2^2} \Rightarrow \frac{S_1}{S_2} = \left(\frac{L_1}{1.1L_1}\right)^2$

$\Rightarrow \frac{S_1}{S_2} = \frac{1}{1.21}$

$S_2 = 1.21\ S_1$

∴ Sag increases by 21%

71. In a BJT, $I_{CO} = I_{CBO} = 2\mu A$. Given α = 0.99, the value of $I_{CEO}$ is

A. 2 μA
B. 99 μA
C. 198 μA
D. 200 μA

Ans. D

Sol. $I_{CEO} = \frac{I_{CBO}}{1-\alpha}$

$= \frac{2\mu A}{1-0.99} = 200\mu A$

72. A moving coil instrument of 20 Ω resistance takes the maximum current 200 mA. The value of resistance required to connect with instrument to measure voltage up to 600V.

A. 2.98 kΩ in series
B. 2.98 kΩ in parallel
C. 1.98 kΩ in Series
D. 1.98 kΩ in parallel

Ans. A

Sol. To extend the range for voltage measurement, a series resistance has to connect with meter,

Rse = (m – 1) Rm …….(i)

m = multiplying factor = Vfs/Vm

Vfs = Required full scale voltage

Vm = meter voltage

$Vm = 200 \times 10^{-3} \times 20 = 4\ V$

Vfs = 600V

$m = \frac{V_{rs}}{V_m} = \frac{600}{4} = 150$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

From eqn (i)

$\therefore$ Rse = (150 – 1) × 20

= 149 × 20

= 2980 = 2.98 k Ω

Rse = 2.98 k Ω

73. The function of Guard ring in transmission lines is –

A. To reduce the transmission losses.

B. To reduce the earth capacitance of lowest unit.

C. To increase the earth capacitance of lowest unit.

D. None of these

Ans. B

Sol. The function of the Guard ring is to reduce the earth capacitance of lowest unit in order to establish uniform voltage across all units of string. This will increase the efficiency of transmission line.

74. When a BJT is employed as an "ON switch" it will operate in …….region with collector-Base junction …….. Bias.

A. Saturation, Reverse

B. Cut off, Forward

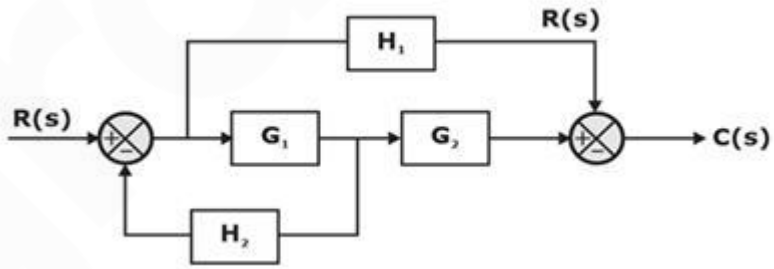
C. Saturation, Forward

D. Cut off, Reverse

Ans. C

Sol. As an "ON switch", BJT will operate in saturation region with both the junctions as forward Bias.

75. Find the Transfer function $\frac{C(s)}{R(s)}$ of the system:




A. $\frac{G_1G_2}{1+G_1H_2}$

B. $\frac{G_1G_2}{1-G_1H_2}$

C. $\frac{G_1G_2+H_1}{1-G_1H_2}$

D. $\frac{G_1G_2+H_1}{1+G_1H_2}$

Ans. D

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. According to Mason's Gain formula

$$T.F = \frac{P_1\Delta_1 + P_2\Delta_2}{\Delta}$$

No of forward paths (P) = 2

$P_1 = G_1G_2$, $P_2 = H_1$

Number of Loops = 1 ($L_1 = -G_1H_2$)

There are no-non touching loops.

$\Delta = 1 - (L_1) = 1 + G_1H_2$

$\Delta_1 = \Delta_2 = 1$

$$T.F = \frac{G_1G_2 + H_1}{1 + G_1H_2} = \frac{C(s)}{R(s)}$$

76. The Q-meter works on the principle of

A. mutual inductance
B. self inductance
C. Series resonance
D. Parallel resonance

Ans. C

Sol. Q-meter works on the principle of series resonance.

77. These are 3 units in a string insulator voltage across the bottom most unit is 40% of total voltage. The string efficiency will be:

A. 90%
B. 73.33 %
C. 83.33%
D. 93.33%

Ans. C

Sol. $$\text{Efficiency} = \frac{(\text{Total voltage})}{(\text{no of discs}) \times (\text{voltage at bottom most disc})}$$

$$\eta = \left(\frac{V}{3 \times 0.4V}\right) \times 100$$

$$\eta = \frac{100}{1.2} = 83.33\%$$

78. Which of the following condition is not necessary for alternators working in parallel?

A. Terminal voltage of each machine should be same.
B. The frequency should be same for all alternators.
C. Machines should have equal KVA ratings.
D. Phase sequence of all alternator should be same.

Ans. C

Sol. Having equal KVA ratings of machines running in parallel is not the necessary condition for parallel operation.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

79. In the Force-Current analogy, Inductance L is corresponds into:

A. K
B. $K^2$
C. 1/K
D. $1/K^2$

Ans. C

Sol. In the force current analogy,

$$\Rightarrow F = M\frac{d^2x}{dt^2} + B\frac{dx}{dt} + Kx \Rightarrow i = C\frac{d^2\psi}{dt^2} + \left(\frac{1}{R}\right)\frac{d\psi}{dt} + \left(\frac{1}{L}\right)\psi$$

The inductance(L) is equal to inverse of spring constant (1/k).

80. The number of KVL & KCL equations in a circuit having 5 nodes & 8 branches.

A. 4, 3
B. 3, 4
C. 4, 4
D. 3, 3

Ans. C

Sol. N = 5, b = 8

The number of KVL equations

= (b – n +1)

= 8 – 5 + 1

= 4

The number of KCL equations

= (n – 1)

= 5 – 1

= 4

81. For a transistor, $I_c$ = 20 mA and $I_B$ = 0.8 mA. Then the value of current gain α is.

A. $\frac{25}{26}$
B. $\frac{26}{25}$
C. $\frac{24}{25}$
D. $\frac{23}{25}$

Ans. A

Sol. We know that,

$$I_c = \beta I_B$$

$$\therefore \beta = \frac{I_C}{I_B} = \frac{20}{0.8} = 25$$

And $\alpha = \frac{\beta}{1+\beta} = \frac{25}{26}$

82. A DC machine has maximum efficiency when:

A. Variable loss = 1/constant loss
B. Variable loss = $\sqrt{\text{cons tant loss}}$
C. variable loss = (constant loss)$^2$
D. None of the above

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Ans. D

Sol. Condition for maximum efficiency in (variable loss ($I^2R$) = constant loss)

So, None of the above options satisfies this condition.

83. In the wave equation

$$\nabla 2\vec{E} = \mu\varepsilon\frac{\partial 2\vec{E}}{\partial t^2} + \mu\sigma\frac{\partial\vec{E}}{\partial t}$$

which term is responsible for attenuation of the wave?

A. $\nabla^2\vec{E}$

B. $\mu\varepsilon\frac{\partial 2\vec{E}}{\partial t^2}$

C. $\mu\sigma\frac{\partial\vec{E}}{\partial t}$

D. All ot these three

Ans. C

Sol. $\mu\sigma\frac{\partial\vec{E}}{\partial t}$ involves σ i.e. conductivity of a lossy medium, which is responsible for attenuation of the wave.

84. The open loop transfer function $G(s) = \frac{10}{(s+2)(s+4)}$ ,find number of encirclement about(1+j0)

A. 2

B. 0

C. 1

D. 3

Ans. B

Sol. $G(s) = \frac{10}{(s+2)(s+4)}$

characteristic equation= $1+\frac{10}{(s+2)(s+4)} = 0$

$s^2+6s+18=0$

by RH table

| | |
|---|---|
| $s^2$ | 1 18 |
| $s^1$ | 6 0 |
| $s^0$ | 18 |

so open loop system stable (P)= zero

and poles of characteristic equation lying in the left half of s-plane is also zero.

here ( Z=0 ), N=P-Z

N= number of encirclement N=0

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

85. Which of the following is true about silicon diode?

A. Silicon diode is easy to produce as great availability of silicon in Nature.

B. The operation of silicon Diode is stable with change in temperature

C. Silicon diode crystals are not easily damaged by excess heat

D. All of the above

Ans. D

Sol. All statements are true about Si diode.

86. Let the signal x(t) have the Fourier transform X(w). Signal $y(t) = \frac{d}{dt}[x(t-3)]$. Find out the Fourier Transform of y(t).

A. jw X(w)

B. $jwe^{j3w}$ X(w)

C. $we^{-j3}$ X(w)

D. $jwe^{-j3w}$ X(w)

Ans. D

Sol. Given

$x(t) \leftrightarrow X(w)$

By property

$x(t - t_0) \rightarrow e^{-jwt0}X(w)$

and $\frac{d}{dt}[x(t-t_0)] \rightarrow jwe^{-jwt0}X(w)$

Given, $y(t) = \frac{d}{dt}[x(t-3)]$

$Y(w) = jwe^{-jw3}$ X(w)

87. A DC shunt motor having unsaturated magnetic circuit runs at 750 rpm with rated voltage. If the applied voltage is half of the rated voltage the motor will run at

A. 2000 rpm

B. 1000 rpm

C. 750 rpm

D. 500 rpm

Ans. C

Sol. $N \propto \frac{E_b}{\phi}$, (Eb ∝ V) & (φ ∝ V)

Field is unsaturated means (φ ≠ constant)

∴ As applied voltage becomes half both Eb & φ becomes half.

Hence, speed will remain constant.

88. Check for controllability and observability of a system having following coefficient matrices

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} 'B = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \text{and } C^T = \begin{bmatrix} 10 \\ 5 \\ 1 \end{bmatrix}$$

A. Controllable but not observable

B. Observable but not Controllable

C. Neither Controllable nor observable

D. Controllable and observable

Ans. D

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. **Controllability test**

$$B=\begin{bmatrix}1\\0\\1\end{bmatrix}\ 'A=\begin{bmatrix}0 & 1 & 0\\0 & 0 & 1\\-6 & -11 & -6\end{bmatrix}$$

$$AB=\begin{bmatrix}0\\1\\-12\end{bmatrix}\ A^2B\begin{bmatrix}0\\-12\\61\end{bmatrix}$$

**Controllability test Matrix is given by**

$U = [B : AB : A^2B]$

$$U=\begin{bmatrix}1 & 0 & 0\\0 & 1 & -12\\1 & 12 & 61\end{bmatrix}$$

$|U| \neq 0$

$\therefore$ Rank of U is equal to its order ie. 3 $\rightarrow$ System is controllable

**Observability test**

$$C^T=\begin{bmatrix}10\\5\\1\end{bmatrix}\ 'A=\begin{bmatrix}0 & 1 & 0\\0 & 0 & 1\\-6 & -11 & -6\end{bmatrix}$$

$$A^T=\begin{bmatrix}0 & 0 & -6\\1 & 0 & -11\\0 & 1 & -6\end{bmatrix}$$

$$A^TC^T=\begin{bmatrix}-6\\-1\\-1\end{bmatrix}\ '(A^T)^2C^T=\begin{bmatrix}6\\5\\5\end{bmatrix}$$

Observability test is given by $V = [C^T : A^TC^T : (A^T)^2\ C^T]$

$$V=\begin{bmatrix}10 & -6 & 6\\5 & -1 & 5\\1 & -1 & 5\end{bmatrix}$$

$|V| \neq 0$

System is observable

89. When a sinusoidal time varying source is connected to an RL network (having initial conditions zero) the response will be:

A. Natural Response
B. Force Response
C. Natural and Force Response
D. None of the above

Ans. B

Sol. Force response is the system's response to an external source with zero initial condition.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

90. The primary of a 500/5 A, 5 VA, CT Carries 200A and secondary carries 2.5 A. The ratio error of the CT is

A. – 25% B. + 15%

C. +25% D. – 15%

Ans. C

Sol. $\text{Ratio error} = \frac{\text{Nominal Ratio}(K_n) - \text{Actual Ratio}(R)}{\text{Actaul Ratio }(R)} \times 100$

$K_n = \frac{500}{5} = 100$

$R = \frac{200}{2.5} = 80$

∴ Ratio error

$= \left(\frac{100-80}{80}\right) \times 100 = \frac{1}{4} \times 100$

Ratio error = 25%

91. Find the ROC of the signal x(t), Given $x(t) = [2e^{-4t}\, u(t) - 4e^{-2t}\, u(-t)]$

A. -4 < Re (s) < -2 B. Re (s) < -2

C. Re (&) > -4 D. Does not exist

Ans. A

Sol. Laplace Transform of $e^{-at}\, u(t) = \frac{1}{s+a}; \text{Re}(s) > a$

$\because x(t) = [2e^{-4t}u(t) - 4e^{-2t}u(-t)]$

$e_{-4t}(t) \Rightarrow ROC_1$ is Re(s) > −4

$-e^{-2t}u(-t) \Rightarrow ROC_2$ is Re (s) < − 2

Common ROC of both will be (−4 < Re(s) < −2)

92. In case of satellite communication

A. Uplink frequency > Downlink frequency

B. Uplink frequency < Downlink frequency

C. Uplink frequency = Downlink frequency

D. None of the above

Ans. A

Sol. In satellite communication the uplink frequency should be greater than the Downlink frequency.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

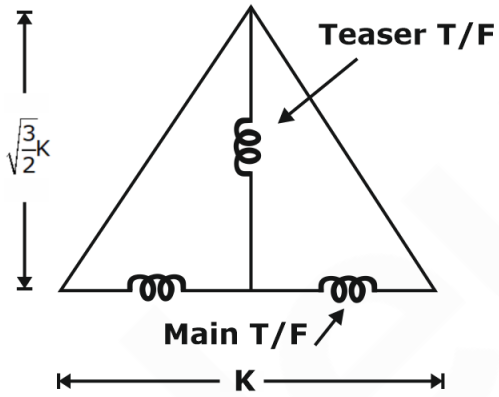
93. In Scott connection, if the turns ratio of main transformer is *K*, then the teaser transformer has turns ratio of

A. $\frac{2K}{\sqrt{3}}$ B. $\frac{\sqrt{3}K}{2}$

C. $\frac{K}{\sqrt{3}}$ D. $\frac{K}{2}$

Ans. B

Sol. To have 120° phase shift the triangle should be equilateral.




If Base is *K*. The height becomes $\frac{\sqrt{3}}{2}K$.

94. A closed Lissajous pattern on a CRO has 5 Horizontal tangencies. The horizontal input and vertical input have the frequencies 100 Hz and 50 Hz respectively. Find out the vertical tangencies.

A. 10 B. 15

C. 20 D. 25

Ans. A

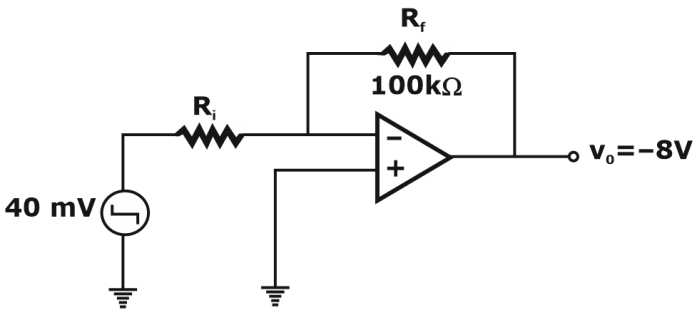
Sol. $\frac{f_y}{f_x} j = \frac{\text{Maximum Horizontal Tangencies}}{\text{Maximum Vertical Tangencies}}$

$\frac{50}{100} = \frac{5}{x} \Rightarrow x = 10$

Maximum possible vertical tangencies = 10

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

95. For given op-amp circuit, What will be the input resistance (Ri) needed to produce an output voltage of -8V is.




A. 0.5 k Ω
B. 5.0 k Ω
C. 50 k Ω
D. 0.05 k Ω

Ans. A

Sol. If is an inverting amplifier

$$\frac{V_{out}}{V_{in}} = \frac{-R_t}{R_i}$$

$$R_i = R_r \times \left(\frac{V_{in}}{v_{out}}\right) = -100K \times \left(\frac{40 \times 10^{-3}}{-8}\right)$$

$R_i$ = 0.5 kΩ

96. Data acquisition systems are usually of

A. analog type
B. digital type
C. integrating type
D. hybrid type

Ans. B

Sol. Data acquisition systems are usually of digital type. In*Data acquisition systems*, abbreviated by the acronyms DAS or DAQ, typically convert analog waveforms into digital values for processing. The components of *data acquisition systems* include: Sensors, to convert physical parameters to electrical signals.

97. Which of the following does not come under systematic errors in Measurement?

A. Instrumental errors
B. Environmental errors
C. Random errors
D. Observational errors

Ans. C

Sol. Random errors does not come under systematic errors in measurement.

98. What will be the Voltage Regulation of a transformer in which ohmic losses is 2% of the output and reactance drop is 6% of the voltage when the power factor is 0.8 lead.

A. 1%
B. +2%
C. -2%
D. -1%

Ans. C

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. Ohmic loss (%R) = 2%

Reactance drop (%X) = 6%

Cos φ = 0.8 lead

VR = [(%R) cos φ – (%X) sin φ]

VR = 2 × 0.8 – 6 × 0.6

VR = -2 %

99. Which of the following is true about electric field boundary conditions, for charge free region?

A. Tangential components of electric field are unequal across the boundary interface.

B. Normal components of electric flux Density are unequal across the boundary.

C. Normal components of electric flux Density are equal across the boundary.

D. All of the above

Ans. C

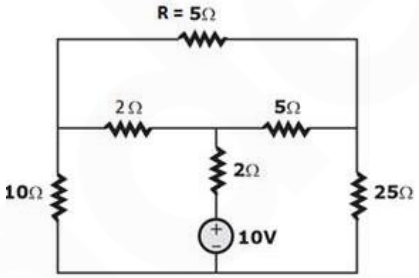
Sol. Tangential components of electric field are equal across the boundary interface.

$E_{1t} = E_{2t}$

Normal components of electric flux Density are equal across the boundary.

$D_{1n} = D_{2n}$

100. The current in the Resistor R will be?




A. 1 A

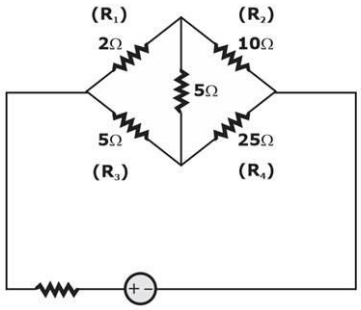
B. 0.5 A

C. 0.25 A

D. 0

Ans. D

Sol. After Re drawing the given circuit




Since bridge is in balance condition.

$R_1R_4 = R_2R_3$

∴ current in R = 5 Ω branch will be 0.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

101. The state transition matrix for the system.

$A\begin{bmatrix}1 & 0\\ 1 & 1\end{bmatrix}$ is,

A. $\begin{bmatrix}e^t & 0\\ 0 & e^t\end{bmatrix}$

B. $\begin{bmatrix}e^t & 0\\ te^t & e^t\end{bmatrix}$

C. $\begin{bmatrix}e^t & te^t\\ 0 & e^t\end{bmatrix}$

D. $\begin{bmatrix}e^t & 0\\ 0 & te^t\end{bmatrix}$

Ans. B

Sol. STM $\varphi(t) = L^{-1}[(sI - A)^{-1}]$

$$|sI - A|\begin{bmatrix}s-1 & 0\\ -1 & s-1\end{bmatrix}$$

$$|sI - A|^{-1} = \frac{1}{(s-1)^2}\begin{bmatrix}s-1 & 0\\ 1 & s-1\end{bmatrix}$$

$$|sI - A|\begin{bmatrix}\frac{1}{(s-1)} & 0\\ \frac{1}{(s-1)^2} & \frac{1}{(s-1)}\end{bmatrix} \Rightarrow \phi(t) = \begin{bmatrix}e^t & 0\\ te^t & e^t\end{bmatrix}$$

102. A 8 pole generator with 128 coil has a two layer LAP winding. The pole pitch is

A. 4

B. 8

C. 12

D. 16

Ans. D

Sol. $\text{Pole pitch} = \frac{\text{slots}}{\text{Pole}}$

In double layer winding.

No. of slots = No. of coil = 128

$\therefore \text{Pole pitch} = \frac{128}{8} = 16$

103. If the spacing between the conductor is decreased then the effect on inductance L and capacitance C of the line will be

A. L and C will increase

B. L and C will decrease

C. L will increase and C will decreases

D. L will decrease and C will increase

Ans. D

Sol. $L = 2 \times 10^{-7} \text{In}\left(\frac{d}{r^1}\right) \text{H/m}$

$$C = \frac{2\pi\varepsilon_0\varepsilon_r}{\text{In}\left(\frac{d}{r}\right)} \text{F/m}$$

If d → distance between conductor is decreased then L will decrease and C will increase.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

104. Corona loss in an AC transmission line is 60 kW. What will be the corona loss for DC transmission for same line.

A. 0 B. 60 kW

C. 20 kW D. 30 kW

Ans. C

Sol. DC corona loss $= \frac{1}{3}$(AC corona loss)

$= \frac{1}{3} \times 60 = 20\text{kw}$

For same line DC corona loss is $\frac{1}{3}$ rd of AC corona loss.

105. Consider the following statements:

The open-circuit test in transformer can be used to obtain.

1) Core losses.

2) Magnitude of exciting current.

3) Copper losses.

4) Equivalent series impedance.

Correct statements are

A. 1, 2, 3 and 4 B. 1 and 3 only

C. 1 and 2 only D. 2 and 4 only

Ans. C

Sol. The open circuit test is used to obtain

→ Core losses or iron losses.

→ Magnitude of exciting current.

106. For a system the state transition matrix is given below

$$\phi(t) = \begin{bmatrix} e^{-4t} & e^{-3t} + 2 \\ e^{-4t} + e^{-3t} & e^{-3t} - e^{-2t} \end{bmatrix}$$

Find the determinant of the matrix 'A' _____?

A. -10 B. -15

C. 17 D. -17

Ans. D

Sol. $\varphi(t) = e^{At}$

$$\frac{d\phi(t)}{dt} = Ae^{At}$$

$$\lim_{t\to\infty} \frac{d\phi(t)}{dt} = Ae^{A(0)} = A$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

$$\frac{d\phi(t)}{dt} = \begin{bmatrix} -4e^{-4t} & -3e^{-3t} \\ -4e^{-4t} - 3e^{-3t} & -3e^{-3t} + 2e^{-2t} \end{bmatrix}$$

At t = 0

$$A = \begin{bmatrix} -4 & -3 \\ -7 & -1 \end{bmatrix}$$

$|A| = 4 - 21 = -17$

107. Two alternator working in parallel having inertia constant 20MJ/MVA and 30 MJ/MVA. What will be equivalent inertia constant of the system.

A. 12 MJ/MVA
B. 8 MJ/MVA
C. 50 MJ/MVA
D. 24 MJ/MVA

Ans. A

Sol. $H_1$ = 20 MJ/MVA

$H_2$ = 30MJ/MVA

$$Heq = \frac{H_1 H_2}{H_1 + H_2}$$

$$= \frac{20 \times 30}{50} = 12MJ / MVA$$

108. Which of the following statement is true about HVDC.

A. More stability problem
B. Skin and Ferranti effect
C. Ground cannot be used as return conductor
D. No charging current

Ans. D

Sol. * HVDC transmission is independent of frequency. So, no stability problem.
* No skin and Ferranti effect as frequency is zero.
* Ground can be used as return conductor.
* No line capacitance is form, so there is no charging current.

109. Find out the correct statements:

(i) To synthesis a network having series combination of elements, we use Foster 1st form.
(ii) Foster first form of driving point impedance consists of parallel LC circuits.

A. only (i)
B. only (ii)
C. Both are correct
D. Both are incorrect

Ans. A

Sol. Foster first form of driving point impedance consists of series LC circuit.

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

110. Instrument transformers are

A. Used to extend the range of the Ac measuring instruments only

B. Used to isolate the measuring instruments from the high voltage only

C. Used to extend the range and isolate the measuring instruments

D. Not used at generating stations and transformer stations

Ans. C

Sol. Instrument transformers are used to measure high voltages and high current. They also provide isolation faulty conditions.

111. An RLC series circuit has two half power frequencies 52.5 Hz and 47.5 Hz. Find out the quality factor.

A. 5 B. 10

C. 15 D. None of the above

Ans. B

Sol. Given $f_1 = 47.5$ Hz

$f_2 = 52.5$ Hz

B.W = $(f_2 - f_1) \Rightarrow 5$Hz

And resonance frequency

$$f_0 = \sqrt{f_1 f_2}$$

$$f_0 = \sqrt{(47.5)(52.5)} = 50\text{Hz}$$

$$\therefore Q = \frac{f_0}{(f_2 - f_1)} = \frac{50}{5} = 10$$

112. A power factor meter has:

A. One current and one pressure coil B. One current and two pressure coil

C. Two current and two pressure coil D. Two current and one pressure coil

Ans. B

Sol. The meter has one fixed coil which acts as a current coil. This coil is split into two parts. The meter has two identical pressure coil which are pivoted on the spindle.

113. An energy meter, having meter constant of 1000 revolution / kWh, makes 50 revolution in 20 seconds for a constant load. The total load will be.

A. 9 kW B. 18 kW

C. 27 kW D. 36 kW

Ans. A

Sol. Meter constant (k) = 1000 rev/kWh

No of revolution = 50

Time = 20 seconds = 20 / 3600 hours

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

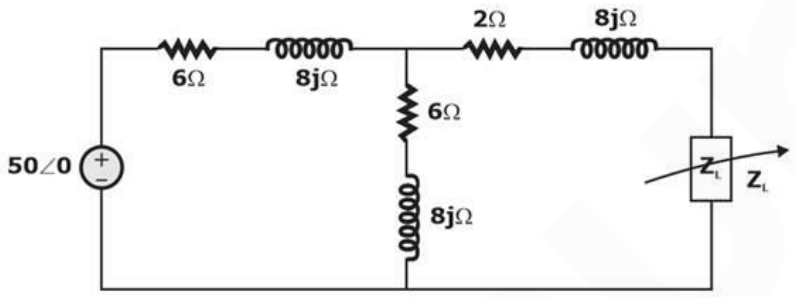
$$\text{Meter constant} = \frac{\text{Revolutions}}{\text{kwh(energy)}}$$

$$1000 = \frac{50}{P(kW) \times \frac{20}{3600}} \quad (E = p \times t)$$

P(kW) = 9 kw

Total load will be 9 kW.

114. In the figure $Z_L$ consists of a pure resistance. If V = 50V. The value of $Z_L$ for maximum power transfer is :




A. 13 Ω

B. 5 – 12j

C. 5 + 12j

D. 5 Ω

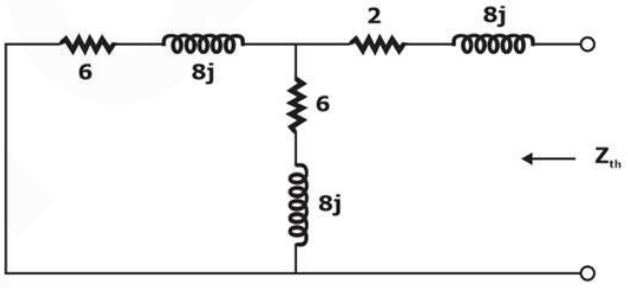
Ans. A

Sol. According to maximum power transfer theorem,

$Z_L = Z_{th}$

As $Z_L = R = \sqrt{R_{th}^2 + X_{th}^2} = |Zth|$

So,




Zth = (6 + 8j) ||(6 + 8j) + (2 + 8j)

= (3 + 4j) + (2 + 8j)

= 5 + 12 j

$Z_L = Z_{th} = 5 - 12j$

$|Zth^*| = R_L = \sqrt{5^2 + 12^2} = 13$

$R_L = 13\ \Omega$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

115. An ammeter is having its deflecting torque varying as the square of the current passing through it. If a current of 10A produces a deflection of 45°. What amount of current among given below will cause the full scale deflection?

A. 25 A
B. 15 A
C. 20 A
D. 100A

Ans. C

Sol. Given, $T_d \propto I^2$ and $T_c \propto \theta$

At operating condition, (Deflecting Torque = Controlling Torque)

$T_d = T_c$

$\therefore \theta \propto I^2$

Full scale deflection = 180°

$$\frac{\theta_1}{\theta_2} = \left(\frac{I_1}{I_2}\right)^2$$

$$\frac{45^\circ}{180^\circ} = \left(\frac{10}{I_2}\right)^2 \Rightarrow I_2 = 20A$$

116. Stiffness of electromagnetic coupling between stator and rotor magnetic fields in a synchronous machine is

A. the same as synchronizing power coefficient
B. inversely proportional to the synchronizing power coefficient
C. not related to the synchronizing power coefficient
D. the square of the synchronizing power coefficient

Ans. A

Sol. Synchronizing power coefficient $P_{sy}$ gives the change in power delivered or received by the machine per unit change in the torque angle or load angle. A large $P_{sy}$ means more power for a given change in the angle. The coupling between the stator and rotor magnetic field is called stiffer if a small change in the angle between the axes of these fields leads to a large change in power delivered or received. Thus, synchronizing power coefficient and stiffness of electromagnetic coupling are the same.

117. In Back to Back test on Transformers, the primaries and secondary are connected in the following manner-

A. Primaries in parallel and secondary in series
B. Primaries in series and secondary in parallel
C. Primaries in parallel and secondary in parallel
D. Primaries in series and secondary in series

Ans. A

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

Sol. Transformers are connected back to back such that their primaries are in parallel across the same voltage source and the secondary in series so that one transformer is loaded on the other in Back to Back test.

118. A separately excited DC motor has armature resistance of 0.5 Ω it runs on a 250V DC supply drawing an armature current of 20A, 1000 rpm. The Torque developed by motor

A. 43.33 Nm
B. 48.53 Nm
C. 45.83 Nm
D. 43.83 Nm

Ans. C

Sol. Power = Eb Ia = T.W

$$T = \frac{E_b I_a}{w} = \frac{[250 - (0.5)20]20}{2\pi N / 60}$$

$$T = \frac{240 \times 20 \times 60}{1000 \times 2\pi} = 45.83\text{Nm}$$

119. Voltage drop is the main consideration while designing a –

A. Feeder
B. Distributer
C. Service mains
D. All of the above

Ans. B

Sol. Constant current is the main consideration in designing a feeder.
Voltage drop is the main consideration in designing a distributor.

120. For a closed loop system to be stable the gain crossover frequency ($\omega_{gc}$) and phase crossover frequency ($\omega_{pc}$) will be related as-

A. $\omega_{gc} < \omega_{pc}$
B. $\omega_{gc} > \omega_{pc}$
C. $\omega_{gc} = \omega_{pc}$
D. None of the above

Ans. A

Sol. If $\omega_{gc} < \omega_{pc}$, in this case both the GM (Gain Margin) and PM (Phase Margin) will be positive. So, the closed loop system will be stable in this case.

121. The fundamental period of discrete time signal $x[n] = ej\left(\frac{5\pi}{6}\right)^n$ is

A. 6/5π
B. 12/5
C. 6
D. 12

Ans. D

Sol. Period of x[n],

$$N_o = \frac{2\pi}{\Omega_0}(m)$$

$m \rightarrow$ integer

$$= \frac{2\pi}{\left(\frac{5\pi}{6}\right)} m$$

$$= \frac{12}{5} \times 5 \ (m = 5) \ = 12$$

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

122. When a Transverse electromagnetic (TEM) wave is propagating in the y-direction than magnetic vector Hy equal to.

A. Ey
B. 0
C. Ex + Ez
D. Hx + Hz

Ans. B

Sol. In TEM wave, both the vectors E and H are perpendicular to the direction of propagation so, wave is propagating in y-direction.

Therefore, Hy = 0

123. An inductor designed with 400 turns coil wounds on an iron core of 16 $cm^2$ cross section area and with a gap length of 1 mm. What will be the inductance of the coil?

A. 300 mH
B. 322 mH
C. 348 mH
D. 388 mH

Ans. B

Sol. $L = \frac{\mu_o N^2 A}{l} = \frac{4\pi \times 10^{-7} \times (400)^2 \times 16 \times 10^{-4}}{(1 \times 10^{-3})}$

L = 0.3217 = 321.8 mH

124. Transfer function of a compensator is given by

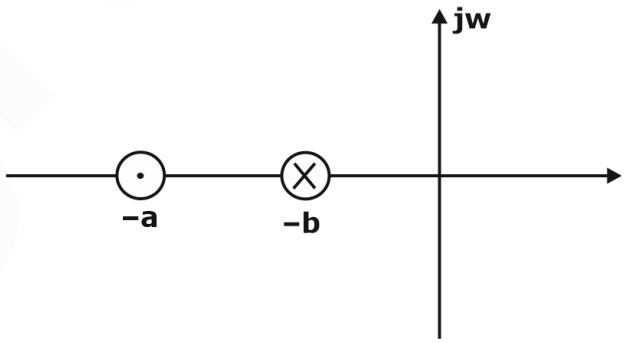
$$G_c(s) = \frac{(s+a)}{(s+b)}$$

Gc (s) is a lag compensator if

A. a = 3, b = 2
B. a = -3, b = -2
C. a = 2, b = 3
D. a = -2, b = -3

Ans. A

Sol. Pole zero diagram for phase lag compensator.




For phase lag compensator

a > b

∴ Option A is correct

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

125. For a transmission line given;

Xs = 20 Ω

Xm = 5 Ω

What will be its Z1, Z2 & Z0 for a fully transposed line?

A. Z1 = Z2 = 15 Ω, $Z_0$ = 30 Ω

B. Z1 = Z2 = 25 Ω, Z0 = 30 Ω

C. Z1 = Z2 = 15 Ω, Z0 = 25 Ω

D. Z1 = Z2 = 25 Ω, Z0 = 25 Ω

Ans. A

Sol. For transmission line,

Z1 = Z2 = (Xs – Xm) = (20 – 5) = 15 Ω

Z0 = (Xs + 2Xm) = (20 + 10) = 30 Ω

Z1 = Z2 = 15 Ω

Z0 = 30 Ω

****

Electrical Engineering Exams
Get unlimited access to all 190+ mock tests designed by experts & toppers with detailed performance analysis

# OUR TOP GRADIANS IN GATE 2020

## Toppers in GATE 2020 Electrical Engineering

Nikhil Kumar

**AIR-9**

EE

Himanshu Kumar

**AIR-9**

EE

## GATE 2020 Gradeup Achievers


**60+ Gradians in Top 100**


**Target GATE 2021**

A Electrical Engineering Course **Batch-2**

START FREE TRIAL

Classroom

# Target GATE 2021

## A Electrical Engineering Course **Batch-2**

**Crack RRB NTPC 2019-20 with a day-wise study plan**

## Why take this course?

- Clear RRB NTPC (CBT-1 & CBT-2) With The Most Comprehensive Course
- Topics are covered through Live Classes, Quizzes, Study Notes & Doubt Resolution Sessions
- Comprehensive Course Coverage with Weekly Assessments & Mock Tests along with Analysis
- Get Exam Ready with Full-length Mock Tests & their Detailed Analysis


Ashutosh Saxena, Rakesh Talreja, MN Ramesh, Vijay Bansal, Chandan Jha

Prep Smart. Score Better. Go gradeup

www.gradeup.co